

**Clinical Practice Guideline**  
**For**  
*The Management of Dental Trauma*



## MANAGEMENT OF DENTAL TRAUMA IN CHILDREN



Injuries to children's teeth can be very distressing for children as well as their parents. Dental trauma may occur as a result of a sports mishap, an altercation, a fall inside of the home, or other causes. Prompt treatment is essential for the long-term health of an injured tooth. **Obtaining dental care within 30 minutes can make the difference between saving or losing a tooth.**

### Causes and frequency of dental trauma

Approximately 30% of children have experienced dental injuries. Injuries to the mouth include teeth that are knocked out, fractured, forced out of position, pushed up, or loosened. Root fracture and dental bone fractures can also occur.

The peak period for trauma to the primary teeth is 18 to 40 months of age, because this is a time of increased mobility for the relatively uncoordinated toddler. Injuries to primary teeth usually result from falls and collisions as the child learns to walk and run.

With the permanent teeth: school-aged boys suffer trauma almost twice as frequently as girls. Sports accidents and fights are the most common cause of dental trauma in teenagers. The upper (maxillary) central incisors are the most commonly injured teeth consisting of about 71%. Maxillary teeth protruding more than 4 mm are two to three times more likely to suffer dental trauma than normally aligned teeth.

### Types of dental trauma

Dento-alveolar trauma may be classified into categories based on treatment protocols. These categories include: **dental avulsion, dental luxation and extrusion, enamel and crown fracture, dental intrusion, dental concussion and subluxation, root fracture, and alveolar bone fracture.**

### Clinical evaluation of dental trauma

- **Medical history**

Take a complete medical history. Assess the need for SBE prophylaxis. Determine if the child has a bleeding disorder, or is immunocompromised. Record any current medications. Question the parent about allergies to medications. Obtain a history of any prior surgeries. Determine if the child's tetanus immunization is up-to-date. Determine if the child lost consciousness due to the injury.

- **Physical examination**

A thorough examination is necessary to assess the full extent of all injuries. Important information to be gathered for each patient includes: vital signs, review of all systems, head and neck exam, and accident information. It is important to rule out head injury, ocular damage, and cervical spine injury. An evaluation of pupil size and reaction to light may establish the presence of head injury.

- **Neurological Assessment.** Obtain information in reference to loss of consciousness, Neck or head Pain and numbness. Ask about the patient's account of the event to test for amnesia. Look out for other signs like nausea, vomiting, drowsiness and blurred vision. When in Doubt refer to A&E
- **Dental history.**

The clinician should determine how, when, and where the injury occurred. "How" is important because it provides information on the severity of the injury. "When" is important, because the prognosis for the injured tooth worsens with every minute of delay in treatment. "Where" is important, because it may determine whether or not tetanus prophylaxis is warranted.
- **Extraoral examination.**

The location and size of all extraoral and intraoral injuries must be recorded. Palpate the mandible, zygoma, TMJ, and mastoid region. Ensure that no mandibular or maxillary fractures are present. Find any mandibular fractures by palpating the lower border of the mandible for a "step-down" fracture. Record any extraoral lacerations, bruises, or swelling. If a laceration is present in the upper or lower lip, the area must be inspected for foreign bodies such as gravel or tooth fragments. Any foreign bodies must be debrided from the soft tissue.

The mandibular condyles and maxilla should be carefully palpated. Check jaw movements for normal range of movements. Chin lacerations require careful evaluation of the cervical spine and mandibular condyles. Indications of condylar fractures include: an anterior open bite, a malocclusion, or limited mandibular opening. Confirmation of condylar fractures requires a panoramic radiograph with closed – and open – mouth views.
- **Intraoral examination.**

All extraoral and intraoral clots and debris must be removed prior to examining the oral soft and hard tissue. Palpate the alveolus to detect any fractures. Have the patient clench the teeth so that the dental occlusion can be evaluated. Each tooth should be examined for damage or mobility.

The labial mucosa, maxillary frenum, gingival tissues, and tongue should be examined for bruising or lacerations. All intraoral lacerations must be cleaned and explored, looking for any foreign bodies. The oral frenum, when torn, will heal without long-term consequences. A tongue laceration should be sutured if the tissue edges are not self-approximating. Most intraoral impalement injuries will heal on their own – except for soft tissue avulsion injuries.
- **Radiographic examination**

For evaluating injuries to the maxillary or mandibular teeth, an occlusal radiograph is the film of choice. If a root fracture is suspected, radiographs at two different angles are required for a definite diagnosis. For intruded teeth, a lateral anterior radiograph provides additional useful information. A panoramic radiograph helps to evaluate suspected mandibular or condylar fractures. Limitations of availability of x-rays or its interpretations, cases must be referred to the next senior level clinic. i.e. sub-division to Division hospitals.
- **Photographic documentation**

The use of preoperative and postoperative photography is very useful for documentation purposes.
- **Tetanus Coverage**

Uncovered children – Dose of Antitoxin (Tetanus Immune Human Globulin)  
Children with previous but dated coverage – Toxoid Booster  
Active immunization – 3 injections of DPT. Booster at 11/2 and 3 years, 6 years of age and every 4-5 years

## Reaction of the Tooth to Trauma

- ✓ **Pulp Hyperemia** – may lead to infarction and necrosis
- ✓ **Internal Hemorrhage** – capillary rupture due to increase pressure within 2-3 weeks
- ✓ **Calcific Metamorphosis**-
- ✓ **Internal Resorption**- Due to Osteoclastic action > institute endodontic treatment immediately
- ✓ **Peripheral Root Resorption**- Due to damage of periodontal structures usually in severe injuries with displacement of teeth. The types are: Surface- normal PDL, small areas  
Replacement- Ankylosis  
Inflammatory- Granulation tissue, radiolucency
- ✓ **Pulpal Necrosis**- Due to severance of apical vessels or prolonged hyperemia and strangulation. May not occur for months
- ✓ **Ankylosis – PDL** injury causing inflammation and activating Osteoclastic activity resulting in fusion between bone and root surface

## Reaction of the Permanent Tooth Buds

- Hypocalcification/hypoplasia (Turner's tooth - due to trauma, infection, or both)

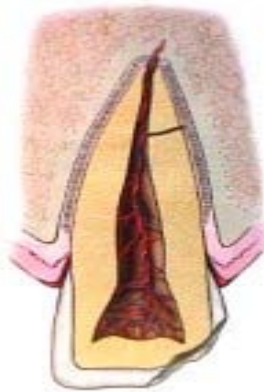


- Reparative dentin
- Dilaceration



- Sequelae of chronic infection

## Tooth fracture (infracture, Ellis class I, Ellis class II or III)



### A. DIAGNOSIS

- Crown fractures comprise about 33% of injuries to primary teeth, and about 75% of injuries to permanent teeth. A crown fracture is classified based on the location of the fracture in relation to the enamel, dentin, or pulp tissue of the tooth.
- If the fracture of the crown is incomplete, or if it produces cracks in the enamel, it is referred to as an enamel craze, crack, or infracture. The craze lines begin at the enamel surface and end at the enamel-dentin junction.
- The Ellis fracture classification has six categories, but only the first three are commonly described in medical literature. **An Ellis class I fracture involves the enamel portion of the tooth, is rarely painful, and is not a true emergency.**

An Ellis class II fracture involves enamel as well as dentin, allowing the entry of bacteria into the dentin tubules, as well as chemical or thermal irritation of the pulp canal. Ellis class II fractures are recognized by the yellow to pink color of the dentin.

- In an Ellis Class III fracture (severe), the dental pulp is exposed – requiring immediate care. The fracture site will have a reddish tinge or will show bleeding. In an Ellis class III dental fracture, exposure of the pulp's nerve endings can cause extreme pain – even if exposed only to air. Exposure of the pulp in an Ellis class III fracture will eventually lead to pulpal necrosis from bacterial infection, if left untreated.
- **B. FIRST AID**
    - I. PRIMARY TOOTH**

Have the child rinse with warm water. Use a cold cloth or ice pack to reduce swelling. Use acetaminophen for pain, not aspirin. Cover any severe fracture with a biocompatible cement or dressing until a dentist can treat the problem.
    - II. PERMANENT TOOTH**

Have the child rinse with warm water. Use a cold cloth or ice pack to reduce swelling. Use acetaminophen for pain, not aspirin. Cover any severe fracture with a biocompatible cement or dressing until a dentist can treat the problem.

## C. DENTAL OFFICE TREATMENT

### I. PRIMARY TOOTH

- Treatment options for an enamel-dentin crown fracture with pulpal exposure in the primary dentition include:  
direct pulp capping, Cvek pulpotomy, cervical-depth pulpotomy, pulpectomy, or extraction.
- The indication for a partial (Cvek) pulpotomy is: a small and recent pulpal exposure less than 2 weeks old. A diamond bur or a 330 carbide bur is used to amputate the pulp to a depth of 2 mm. Only saline irrigation is used to achieve hemostasis. Then calcium hydroxide paste is placed, followed by a glass ionomer cement to seal the area.  
Recalls are scheduled at 1, 3, and 6 month intervals.
- Indications for a deep cervical pulpotomy include:  
a large pulpal exposure, pulpal exposures older than 2 weeks, or if hemostasis cannot be obtained during a Cvek pulpotomy procedure. Formocresol or ferric sulfate is used to obtain hemostasis during a deep cervical pulpotomy. ZOE paste or glass ionomer is used to seal the area.
- When the trauma has resulted in chronic inflammation or necrosis of the pulp, a pulpectomy should be considered.

### II. PERMANENT TOOTH

- Treatment for a case of enamel infraction consists of sealing the cracks – using any enamel adhesive system.
- For an Ellis class I dental fracture, dental care involves removing the sharp edges to prevent injury to the soft tissues of the mouth. Alternatively, the fracture may be restored with composite material.
- For an Ellis class II fracture, the dentin should be coated with a protective covering, such as a Resin Modified Glass Ionomer or Fuji IX cement – as an interim measure. Allow up to 8 weeks for the injured tooth to recover before placing the final composite restoration.

For an Ellis class III complex fracture of the permanent tooth, the main goal is to retain a viable dental pulp, and permit completion of root growth. Therefore, if the pulp exposure is very recent or very small, a direct pulp cap may be performed. For an exposure larger than 2mm, a Cvek pulpotomy may be performed, removing only a millimeter or two of infected pulp tissue. The Cvek technique consists of using a round diamond bur, amputating the exposed pulp tissue to a depth of 1-2 mm, passively covering the healthy pulp with calcium hydroxide. Then, the area is sealed with a Resin Modified Glass Ionomer or composite material.

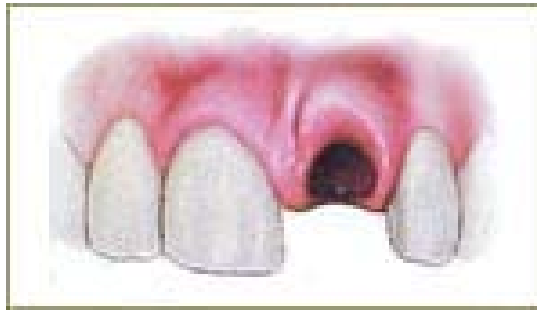
For an exposure older than two hours, a cervical-depth pulpotomy may be needed – ideally using only saline irrigation to achieve hemostasis.

### Class IV. Primary (pulp necrotic)

Formocresol pulpectomy, in absence of significant internal or external root resorption

Extraction +/- space maintainer if endodontic treatment not possible

## Class V. Avulsion (Knocked-out tooth) –Class V



### A. DIAGNOSIS

A dental avulsion occurs when a tooth is completely displaced or knocked out of the dental socket. Dental avulsion injuries occur most frequently in children between the ages of 7 and 9, an age when the alveolar bone surrounding the tooth is relatively resilient. Adult teeth that are avulsed (knocked-out) should be considered for immediate replantation in order to enhance the tooth's long-term prognosis.

The best way to preserve a tooth that has been knocked out (avulsed) is to put it back into its socket as quickly as possible. The single most important factor to ensure a favourable outcome after replantation is the speed with which the tooth is reimplanted. If immediate replantation isn't possible, the tooth should be placed into a protective solution.

Avulsions are associated with poor post-treatment outcomes. Almost all replanted teeth show replacement resorption and ankylosis – because immediate replantation rarely happens. Replacement resorption leads to fusion of the tooth root with the adjacent alveolar bone. In children who have not achieved skeletal maturity, replacement resorption leads to progressive infraocclusion (the tooth appears unerupted) during the adolescent growth spurt.

Every tooth has a protective layer surrounding the root, which is called the periodontal ligament. The periodontal ligament is very sensitive, and will quickly dry out and die - unless the tooth is immediately placed in a protective solution, such as milk or saline. With every minute that the tooth is left out of the mouth to dry, more cells in the periodontal ligament will die. After 15 minutes of dry storage, irreversible damage to the periodontal cells (the root covering) occurs. If the cells of the periodontal ligament are allowed to die, the child will eventually lose the tooth. The goal of re-implanting the tooth into the socket is to preserve the health of the tooth's outer periodontal ligament.

### CONSENT:

Appropriate Consent from Parent/Guardian must be completed before any treatment proper begins.

## B. FIRST AID FOR AN AVULSED TOOTH

### I. PRIMARY TOOTH

- **A primary tooth that has been avulsed is usually not re-implanted.** The risk of injury to the developing permanent tooth bud is high.

### II. PERMANENT TOOTH

- Do not touch the root of the tooth. Handle the tooth by the crown only.
- Rinse the tooth off only if there is dirt covering it. Do not scrub or scrape the tooth.
- Attempt to reimplant the tooth into the socket with gentle pressure, and hold it in position.

- If unable to reimplant the tooth, place it in a protective transport solution, such as Hank's solution, milk, or saline. This will hydrate and nourish the periodontal ligament cells which are still attached to the root. A small container of Hank's Balanced Salt Solution can be purchased in dental emergency kit form at many drug stores. Contact lens solution is not an acceptable storage medium.
- The tooth should not be wrapped in tissue or cloth. The tooth should never be allowed to dry.
- Take the child to a dentist or hospital emergency room for evaluation and treatment.
- Radiographs may need to be taken of the airway, stomach, and mouth if the tooth cannot be found .
- Tetanus prophylaxis should be considered if the dental socket is contaminated with debris.

## C. DENTAL OFFICE TREATMENT FOR AN AVULSED TOOTH

### I. PRIMARY TOOTH

- **The primary avulsed tooth is generally not reimplanted** – to avoid injury to the developing permanent tooth bud.

### II. PERMANENT TOOTH

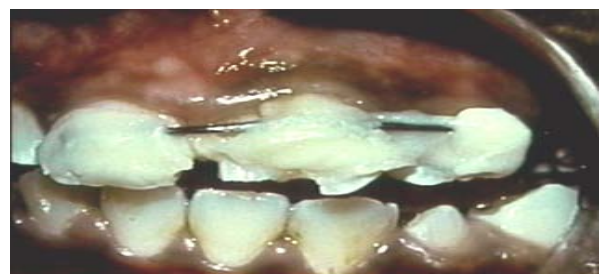
- Place the tooth in Hank's Balanced Salt Solution.
- Take a medical and dental history, and perform a physical examination. Rule out CNS injury.
- Examine the orofacial area. Inspect the oral soft tissue for embedded tooth fragments, lacerations, or ecchymosis (bruising). Palpate the teeth and dentoalveolar area to check for mobility. Evaluate TMJ function.
- If the tooth is missing, rule out aspiration or ingestion.
- Take a maxillary occlusal radiograph, as well as a lateral anterior radiograph of the injured area. Consider taking a panoramic radiograph to rule out condylar or mandibular fractures.
- Gently aspirate the injured area without entering the socket. If a clot is present, dislodge and remove it using light saline irrigation. Do not curette the socket.
- The tooth should be carefully held by the crown, and not by the root. The avulsed tooth should be reintroduced into the dental socket slowly.

- **Splinting - Techniques**

#### Splinting – Good



#### Splinting – Not Good





- **030 Stainless steel wire + Composite (old)**
- **.0175 Twist (Wildcat) + Composite**
- **Composite alone**
- **Avulsion: 7 days**
- **Root fractures: 1-3 months**

### **TOOTH REIMPLANTATION GUIDELINES**

- For A Mature Tooth With A Closed Apex: If the extraoral dry time is <60 minutes, reimplant as soon as possible. If the extraoral dry time is >60 minutes, soak in citric acid or curette the root; then soak in stannous fluoride for 10 minutes. Rinse with saline. Perform root canal therapy one week following the trauma.
- For An Immature Tooth With An Open Apex: If the extraoral dry time is <60 minutes, soak in doxycycline (1mg/20 ml saline) for 5 minutes. If the extraoral dry time is >60 minutes, provide the same treatment as for a closed apex.
- Apply a flexible, functional splint for 7 to 10 days. If an alveolar fracture is present, provide a very rigid splint for 4-6 weeks.
- After reimplantation, gently compress the facial and lingual bony plates. Suture any lacerations.
- Provide antibiotic coverage for 10 days to prevent infection. Consider prescribing tetracycline or penicillin. Penicillin is prescribed as: PenVK 500mg, 4X per day, for 10 days.
- Prescribe chlorhexidine gluconate rinses, and provide oral hygiene and diet instructions.
- Provide analgesics to control pain. For children, consider prescribing acetaminophen and codeine (Tylenol #3) for mild to moderate pain. The dose is 15 mg/kg/dose of acetaminophen, every 4 hours. Do not exceed 2.6 g/day of acetaminophen.
- Arrange for tetanus vaccination if the wound was dirty, or if the vaccination requires updating.

### **FOLLOW-UP CARE AFTER 7 TO 10 DAYS**

- For a tooth with an open apex, the goal is revascularization of the pulp. For a tooth with an open apex and extraoral dry time <60 minutes: no endodontic treatment is initially required. Re-evaluate every 3-4 weeks for pathosis. In case of pulp pathosis, begin an apexification procedure.>
- For a tooth with an open apex and extraoral dry time >60 minutes: begin an apexification procedure.
- For a tooth with a closed apex: provide traditional endodontic treatment and obturation. This is done to prevent of eliminate toxins from entering the root canal space.
- Remove the splint at this 7 to 10 day treatment visit.
- Patients are recalled to the dental office every 3-4 weeks of sensitivity testing. Thermal tests using difluorodichloromethane or “Endo Ice” may be used.
- Long-term follow-up is essential for 2 to 3 years after the reimplantation procedure.

## ENDODONTIC OBTURATION FOR AVULSED TEETH WITH CLOSED APICES

- For a tooth with endodontic treatment started 7 to 10 days after avulsion, obturate after 1 to 2 months of treatment with calcium hydroxide paste.
- For a tooth with radiographic signs of resorption or pathosis, or for a tooth which had endodontic treatment started more than 14 days after the avulsion, treat long term with a dense mix of calcium hydroxide. The calcium hydroxide is changed about every 3 months. Obturate when an intact lamina dura can be visualized.

### Class VI. Root fracture (apical, mid-root, cervical)



#### A. DIAGNOSIS

- Root fractures occur in only 7% of dental injuries. Horizontal root fractures occur in anterior teeth, and are caused by direct trauma. Vertical root fractures usually occur in molars, and may be caused by clenching or trauma to the mandible. Vertical root fractures are more difficult to detect, and may not be found until extensive tooth destruction has occurred.
  - A horizontal root fracture is classified based on the location of the fracture in relation to the root tip (apex). Horizontal root fractures may occur in: the apical third, middle third, or cervical third of the root. The prognosis worsens the further cervically (towards the crown) the fracture has occurred. Tooth fractures are often not apparent during a clinical examination, and can usually only be diagnosed using appropriate radiographs. Radiographs with at least two views are required for making this diagnosis.

#### B. FIRST AID

##### I. PRIMARY TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling.

Give Tylenol for pain relief.

##### II. PERMANENT TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling.

Give Tylenol for pain relief.

## C. DENTAL OFFICE TREATMEN

### I. PRIMARY TOOTH

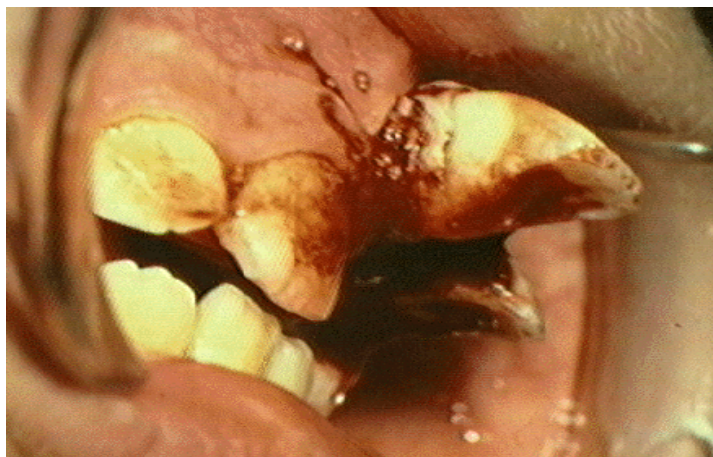
As long as no abscess or excessive mobility occurs, the primary tooth with a fractured root can simply be monitored for health. If a portion of the root is abscessed or extremely mobile, it can be extracted, and the remaining root fragment will resorb normally. For coronal third fractures in primary teeth, the coronal third is extracted, leaving the apical portion of the root to resorb normally. Do not “chase” apical third fragments.

### II. PERMANENT TOOTH

The most important factor in the success and treatment of a horizontal root fracture is the immediate reduction of the fractured segments, and complete immobilization of the coronal segment. Root fractures must be diagnosed before the body tries to “repair” the problem, and before the blood clot prevents apposition of the fractured segments. If more than 24-72 hours have elapsed, it may be impossible to obtain close apposition of the segments.

Treatment for horizontal root fractures consists of rigid fixation (immobilization) in an attempt to get the cementum and dentin to heal. The tooth is splinted to the adjacent normal teeth with a very rigid wire and composite splint for 8 weeks. Serial radiographs are then taken a 6 month intervals after the splint is removed.

## Class VII. Tooth displacement (luxation, lateral displacement, extrusion)



## A. DIAGNOSIS

- Luxation involves displacement of a tooth in a labial, lingual, or lateral direction. If the displacement is less than 5 mm, the dental pulp will remain vital in about 50% of the cases.
- Lateral luxation is an angular displacement of the tooth while it remains within the socket. There is usually an associated fracture of the supporting alveolar bone, especially with labial and palatal luxations.
- An extrusion occurs when a tooth is only partially removed from the socket. In the primary dentition, the alveolar bone surrounding the tooth is relatively elastic, so the most common injury in toddlers is a dental luxation (displacement injury) – with gingival hemorrhage. The primary upper incisors are often pushed toward the palate during a fall.

## B. FIRST AID

### I. PRIMARY TOOTH

Place a cold wet cloth over the mouth, and bring the child to a dentist. Provide pain relief by giving children's Tylenol

### II. PERMANENT TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling. Give Tylenol for pain relief. Try to reposition the luxated tooth back to its normal position using gentle to moderate finger pressure. The patient is then instructed to gently hold the tooth in position. Obtain definitive dental care as soon as possible.

## C. DENTAL OFFICE TREATMENT

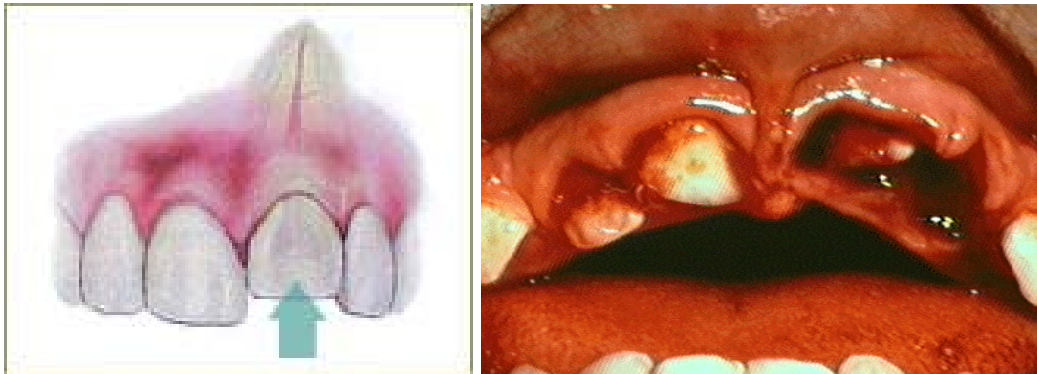
### I. PRIMARY TOOTH

- A **primary tooth with a luxation in the labial direction needs to be extracted, to avoid further damage to the developing permanent tooth bud.**
- In other cases, **however, it is possible to splint the luxated primary tooth back into normal position using resin-modified glass ionomer cement.** The cement is mixed fairly thick, and placed on the labial and lingual surfaces of the luxated tooth – and a few adjacent teeth. The luxated tooth is held in the ideal position while the cement is setting. **The splint is removed after 10 days using a composite finishing bur.**

### II. PERMANENT TOOTH

- For any severe luxation injury: an anti-inflammatory agent (-), an analgesic (-), and an antibiotic (Penicillin) are prescribed.
- **For a lateral luxation, treatment includes: repositioning after local anesthesia, and applying a semi-rigid splint for 2-3 weeks.** A post-treatment radiograph should be performed to assure proper position of the tooth in the socket.
- **For an extrusive luxation, treatment includes: immediate repositioning and placement of a semi-rigid (flexible) splint for 7-14 days.**

## Dental Intrusion- (Tooth pushed up)



### A. DIAGNOSIS

- An intrusion injury is the most severe type of luxation injury. The intruded tooth is impacted into the alveolar bone, and the alveolar socket is fractured. The forces that drive the tooth into the socket wall crush the periodontal ligament, and rupture the blood and nerve supply to the teeth. The tooth may not be visible, and can be mistaken for an avulsion.
- Some studies have shown that intrusions of up to 3 mm have an excellent prognosis, whereas the prognosis of incisors with severe intrusions (> 6mm) is hopeless. If a permanent tooth is involved, radiographs may show an alveolar fracture, or tooth displacement into the nasal cavity. **Pulpal necrosis (death of the dental pulp) occurs in 96% of cases of intruded permanent teeth.**
- If a primary incisor is involved in an intrusion injury, a lateral anterior radiograph (“mini-ceph”) should be taken of the traumatized region to determine the proximity of the intruded primary root tip to the developing adult tooth bud.

### B. FIRST AID

#### I. PRIMARY TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling. Give Tylenol for pain relief.

#### II. PERMANENT TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling. Give Tylenol for pain relief.

### C. DENTAL OFFICE TREATMENT

#### I. PRIMARY TOOTH

- **Allow the primary tooth to spontaneously erupt over a 2 to 3 month period** - as long as the **developing permanent tooth bud has not been injured**. If **re-eruption does not begin within 2 months**, extraction of the intruded primary tooth will be necessary.
- A very intruded **primary incisor, whose root tip is displaced into the developing permanent tooth should be extracted**. Extraction of the intruded tooth will prevent further damage or hypoplasia to the adult tooth bud.

## II. PERMANENT TOOTH

- Current management strategies for intruded permanent incisors include: surgical reduction (immediate repositioning), repositioning with traction (active repositioning), and waiting for the tooth to return to its pre-injury position (passive repositioning).
- Incisors **intruded less than 3mm** may be allowed to **reposition themselves**.
- Incisors **intruded between 3 –6 mm** are unpredictable, but they may be **orthodontically extruded within 3-6 weeks**.
- Incisors that have been **intruded beyond 6 mm** should be **immediately repositioned (surgically) to their normal position – followed by root canal treatment**.
- Root canal treatment is recommended in permanent teeth with complete root development. If there is any doubt about pulp vitality, or if root resorption begins, then a pulpectomy must be performed, followed by interim placement of intra-canal calcium hydroxide. After apical closure and root health are confirmed, the canal is filled with a standard root canal material (gutta percha).

### Subluxation, dental concussion- Tooth was hit

#### A. DIAGNOSIS

Concussion results in mild injury to the periodontal ligament without tooth mobility or displacement. Subluxation causes significant injury to the periodontal ligament resulting in some tooth mobility. There is usually bleeding at the marginal gingival, and the tooth is tender to percussion in subluxation.

A baby tooth may change color after being subjected to trauma. A front tooth can be traumatized during a fall, while running into furniture, while engaging in rough play, or from impact with a blunt object. Dental trauma affects the blood supply to the tooth, and therefore its health and color.

Different color changes suggest specific problems with traumatized baby teeth (primary incisors). Such teeth may turn dark, but in many cases the color will change back to normal after a few months.

Traumatized primary incisors may develop yellow, grey, or pink discolorations.

**A yellow or yellow-brown discoloration indicates calcification and obliteration** of the dental pulp (nerve canal). **No treatment** is usually needed with this type of discoloration.

**A grey or black discoloration indicates necrosis (death) of the dental pulp in 98% of cases.** Such teeth will usually **require root canal treatment or extraction**.

**A pink tooth indicates either internal resorption**, or the presence of blood pigments in the dentinal tubules of the tooth. The pink tooth needs to be monitored closely.

**Treatment of a discolored primary incisor may involve periodic radiographic and clinical evaluation, root canal treatment, or extraction of the tooth - depending on the health of the tooth and the child's ability to cooperate with dental treatment.**

#### B. FIRST AID

##### I. PRIMARY TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling. Give Tylenol for pain relief.

##### II. PERMANENT TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling. Give Tylenol for pain relief.

## C. DENTAL OFFICE TREATMENT

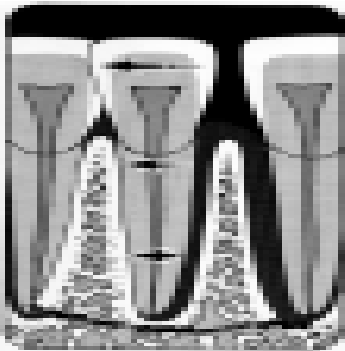
### I. PRIMARY TOOTH

Radiographs are taken to rule out root fractures. The child is then put on a soft diet for a week, at the end of which a recall exam is performed.

### II. PERMANENT TOOTH

If the tooth is very mobile, and can be moved more than 2mm, a flexible wire and composite splint may be placed for 7-10 days.

### Dental bone fracture (alveolar process fracture)



## A. DIAGNOSIS

The alveolar bone, which supports the teeth, may experience a fracture at: the alveolar socket wall, the alveolar process, or as a comminuted (shattered) fracture of the supporting bone. Segmental fractures involve multiple teeth and their supporting alveolar process.

## B. FIRST AID

### I. PRIMARY TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling.

Give Tylenol for pain relief

### II. PERMANENT TOOTH

Rinse with cold water, and keep an ice pack over the lip and mouth to reduce swelling.

Give Tylenol for pain relief.

## C. DENTAL OFFICE TREATMENT

### I. PRIMARY TOOTH

- For any severe luxation injury: an anti-inflammatory agent (Motrin), an analgesic (Tylenol #3), and an antibiotic (Penicillin) are prescribed.
- Treatment of alveolar process fractures requires manually repositioning the segment of displaced teeth back into proper arch alignment. A very rigid splint is applied for two months.

## II. PERMANENT TOOTH

- For any severe luxation injury: an anti-inflammatory agent (Motrin), an analgesic (Tylenol #3 or Percoset), and an antibiotic (Penicillin) are prescribed.
- Treatment of alveolar process fractures requires manually repositioning the segment of displaced teeth back into proper arch alignment. A very rigid splint is applied for two months.

### Class VIII. Coronal/Root Fracture



Vertical fracture following extraction

- **Extraction is usually the only Option**

### Prevention of dental injuries:

Dental injuries increase six fold to eight fold when mouth protection is not used. Education of athletes and coaches may encourage greater use of mouth guards.

Educating physicians and the public about first aid for dental injuries may reduce complications later.

### INFECTION CONTROL:

Compliance to infection control protocol is mandatory in managing dental trauma cases.

### Referees;

<http://dentalresource.org/topic50trauma.html>

[\*Nowak AJ, Slayton RL: Trauma to primary teeth: Setting a steady management course for the office. Contemporary Pediatrics. November 2002; 11:99.\*](#)

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