

## Dental trauma

**A pulpectomy** involves complete pulp tissue removal from the crown and root and is indicated when no vital tissue remains. It is also indicated when root maturation is complete and the permanent restoration requires a post buildup. In the absence of inflammatory root resorption, treatment is to obturate the canal with gutta-percha. One of the greatest challenges facing the clinician is the treatment of a nonvital immature permanent tooth with an **open apex**. Physiologic root maturation cannot occur without the presence of vital pulp tissue, apical papilla stem cells, odontoblasts, and Hertwig epithelial root sheath. Traditional treatment for these cases was an **apexification** procedure wherein CaOH was carried to the root apex to contact vital tissues directly. The CaOH stimulated the formation of a cementoid barrier against which gutta-percha could subsequently be condensed. Multiple visits over a period of 9 to 18 months were required, however, and the outcome was a shortened root with thin walls. Additionally, long-term CaOH therapy has been shown to weaken the tooth root and increase the likelihood of root fractures. An alternative to the CaOH apexification technique for managing devitalized immature incisors is the apical barrier technique using MTA. The material is condensed into the apical area, and allowed to set. Gutta-percha is then condensed against the MTA barrier at a subsequent appointment. Though overall treatment time is greatly reduced, the shortened root and thin walls continue to place the tooth at risk for subsequent cervical root fracture.

### **Regenerative Endodontics**

An alternative to apexification of necrotic immature teeth termed revascularization or “regenerative” endodontics. These procedures seek to replace damaged dentin, root structures, and pulp cells with live tissues that restore normal physiologic function. The concept is to thoroughly disinfect the root canal system and then stimulate bleeding from the apical papilla to fill the root chamber with a blood clot. A host of growth factors in the area then act on

dental stem cells, primarily from the apical papilla, to use the clot as a scaffold and differentiate into healthy cells of the pulp-dentin complex that can complete physiologic root maturation.

The technique is to first cleanse the canal by copious irrigation with sodium hypochlorite or Ethylenediaminetetraacetic acid (EDTA). Owing to the immature status of the root and thin radicular walls, instrumentation is kept to a minimum and used mainly to agitate the irrigant. The irrigant is also activated by placing an ultrasonic tip about 3 mm short of the working length in the canal to facilitate better debridement of the pulp tissue remnants and to minimize the substrate for microbial proliferation. The canal space is then dried using sterile paper points. A triple antibiotic mix of 250 mg ciprofloxacin, 250 mg metronidazole, and 150 mg clindamycin is prepared to a creamy paste with propylene glycol as a vehicle. The antibiotic paste is carefully placed into the root canal system using a Lentulo spiral up to the cemento-enamel junction (CEJ). The access cavity is sealed with a sterile cotton pellet and glass ionomer cement.

The patient is scheduled for follow-up appointments after 3 to 4 weeks. At the follow-up appointment, the area is anesthetized with local anesthetic containing no epinephrine. The antibiotic paste is rinsed out, and a sterile endodontic file is placed beyond the apex to initiate bleeding. A clot is allowed to form as close to the CEJ as possible to facilitate root thickening at the tooth cervix. MTA is then placed against the clot, and the tooth is temporarily sealed with glass ionomer cement. The final restoration is placed at a subsequent appointment. Root maturation should be apparent radiographically within several months

## **5.Crown/Root Fracture**

Without pulp exposure:

fragment removal with or without gingivectomy and restore.

With pulp exposure and immature roots:

Perform a partial pulpotomy to preserve pulp vitality.

Pulp exposure with mature roots:

Perform endodontic treatment then restore with a postretained crown.

Orthodontic or surgical extrusion of apical fragment may be indicated to expose the margins prior to permanent restoration.

Extraction with immediate or delayed implant-retained crown restoration or a conventional bridge. Extraction is inevitable in crown root fractures with a severe apical extension, the extreme being a vertical fracture

### **1. Root fracture**

If the coronal fragment is stable and immobile (high apical root fracture), no treatment is indicated. If the coronal fragment is mobile, reposition and stabilize the fragment with rigid splinting of composite resin and wire or orthodontic appliances for four weeks; If the root fracture is near the cervical area of the tooth, stabilization is beneficial for a longer period of time (up to 4 months).. Root canal therapy should not be initiated until clinical and radiographic signs of necrosis or resorption are apparent. Even in those cases, treatment can often be limited to the coronal fragment, because in most instances the apical fragments maintain their vitality.

### **2. Alveolar fracture**

Reposition any displaced segment and then splint the involved teeth with a flexible splint for 4 weeks. Suture gingival laceration if present

### **3. Subluxation**

Monitor pulpal response until a definitive pulpal diagnosis can be made

#### 4. Extrusive luxation

Extruded permanent teeth should be repositioned as soon as possible and splinted for 2 to 3 weeks. It normally takes the PDL fibers this period of time to reanastomose. Extruded permanent teeth with closed apices will undergo pulpal necrosis; therefore root canal therapy should be initiated after the teeth are splinted. Extruded teeth with open apices have a chance to revascularize and maintain their vitality, so the decision to initiate therapy should be delayed until clinical or radiographic signs indicate necrosis.

#### 5. Lateral luxation

Alveolar bone fractures frequently occur in lateral luxation injuries and can complicate their management. In the most severe cases, PDL and marginal bone loss occur. Treatment is to reposition the teeth and alveolar fragments as soon as possible. A splint should then be applied for 3 to 6 weeks, depending on the degree of bone involvement. If the apices are closed, the pulps will likely become necrotic. Again, teeth with open apices should be monitored until signs of necrosis are evident.

#### 6. Intrusive luxation

**Teeth with incomplete root formation:**

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If the crown remain visible and there is very wide immature apex ( $>2\text{mm}$ ) the tooth may be allowed to re-erupt spontaneously. If no movement is noted within 3 weeks, orthodontic repositioning using light forces should be employed.

**Teeth with complete root formation:**

Mature permanent teeth intruded less than 3 mm should be allowed to reemerge without intervention. If no movement is noted within 3 weeks they should be repositioned surgically or orthodontically before they ankylose. Those teeth intruded beyond 7 mm should be repositioned surgically

### *Soft Tissue Trauma*

The soft tissues are often involved during traumatic injuries to the orofacial area and maybe bruised or lacerated by the impact of teeth against the tissue. Usually application of pressure with gauze to the injured site should provide adequate hemostasis. If hemostasis cannot be obtained or the laceration is so severe the edges are not well opposed, sutures are recommended.



Lips often cushion the teeth during a fall, bearing the brunt of the injury and resulting in bruises and lacerations. If a laceration is present, it should be carefully examined to determine whether a foreign object such as a tooth fragment or gravel has been introduced into the wound.



The maxillary labial frena may tear as a result of a fall. This type of injury is common during falls experienced while learning to walk. However, such an injury occurring in infants who do not walk or crawl is probably due to an object being forced into the child's mouth.



Trauma to the tongue can result in laceration or puncture. Careful examination of the injury is important since the necessity for suturing is dependent on the extent of injury.



Impalement of the soft palate is commonly found in the child who falls while holding an object in the mouth, i.e., a stick, pencil or pen, straw or toothbrush. Most impalement injuries heal spontaneously and do not require treatment, however the area should be thoroughly explored for foreign body objects and a prophylactic antibiotic should be prescribed to avoid infection complications.