



EM CASES SUMMARY

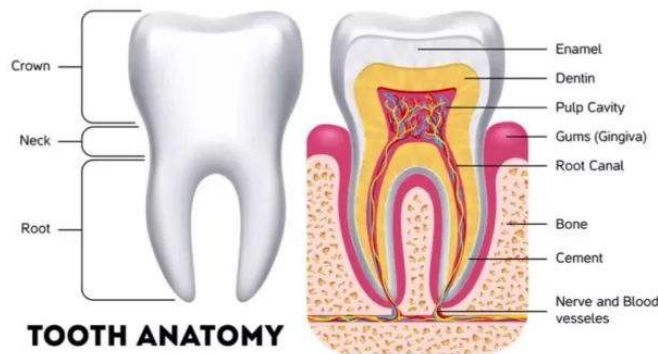
Episode 186 Traumatic Dental Emergencies

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Basic dental anatomy required for dental trauma emergencies

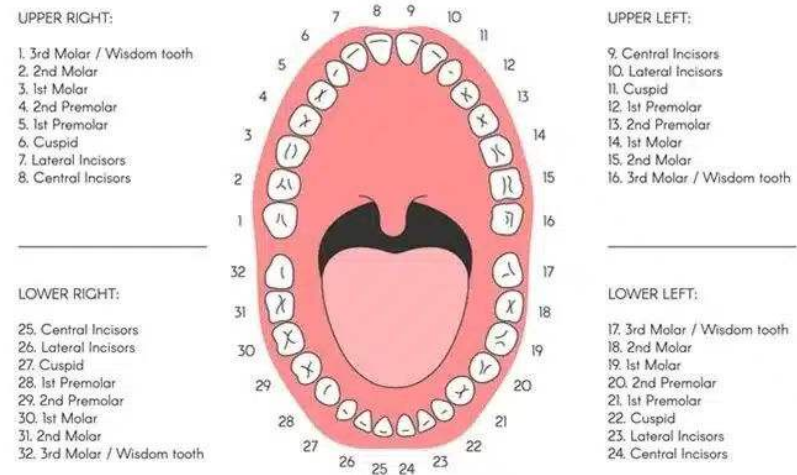
Dental structures (superficial to deep) to know for dental trauma are enamel, dentin, pulp, alveolar bone:



Care of ALiEM Smiler series

Primary dentition vs permanent dentition

Adults most commonly have 32 teeth (permanent dentition) divided into 4 quadrants: left and right mandibular dentition and maxillary dentition.

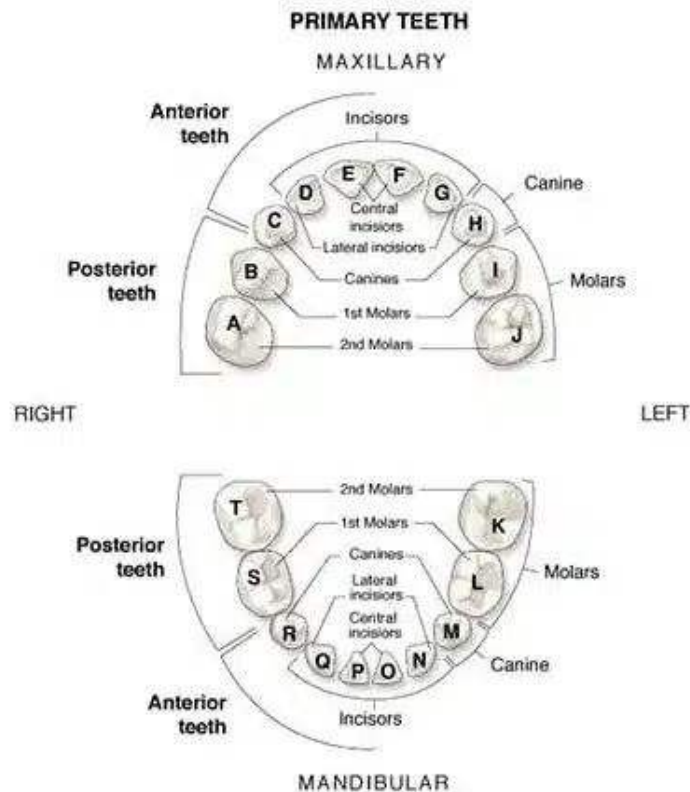


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Children most commonly have 20 primary teeth, usually present by the age of 3 which gradually are replaced by permanent teeth usually between the ages of 6 and 12.

- For children between the ages of 3 and 6 who suffer a tooth avulsion, reimplantation should not be attempted.
- For children between the ages of 7 and 12 who suffer a tooth avulsion, consult a dentist or oral surgeon for decision

making around reimplantation, as it is difficult clinically to distinguish primary vs permanent teeth.



Pitfall: One pitfall is to attempt reimplantation of a primary tooth that has been avulsed. This may lead to ankylosis and prevention of permanent tooth eruption.

Categories of dental trauma: fractures, subluxations, intrusions and avulsions

Dental fractures – uncomplicated vs complicated

The most common traumatic dental injuries are **uncomplicated fractures** of the **enamel and/or dentin** of crown of the tooth (do not extend to level of pulp) which require only observation and follow up with outpatient dentist for consideration of re-bonding. Re-bonding can be attempted in the ED.

Complicated dental fractures involve the pulp of the tooth resulting in exposure of the dental pulp to the oral cavity. Patients often experience severe pain and tooth sensitivity and will ultimately require either a root canal or tooth extraction as an outpatient to prevent infection. In the ED **calcium hydroxide should be applied to the exposed pulp** that is clearly seen as pink tissue within the tooth and arrangements for follow-up with a dentist should be made within 7 days.

Subluxations/Avulsions

Tooth subluxations should be treated with a dental splint (see below) for at least 2 weeks.

Tooth avulsions should be re-implanted and splinted (see below) ASAP in the ED whenever possible.

True traumatic dental emergencies

The most time sensitive traumatic dental emergencies include:

1. **Complicated dental fractures** involving the pulp of the tooth (requires cap of exposed pulp in ED)
2. **Tooth intrusions >3mm +/- underlying alveolar bone fracture** (requires repositioning and stabilization in the ED)
3. **Tooth avulsions** (requires reimplantation, when possible, in the ED)

Imaging in traumatic dental emergencies – indications, Panorex vs CT

Consider a CXR to identify aspirated tooth fragments or whole tooth if these cannot be accounted for otherwise.

Panoramic x-ray ('Panorex' view) is indicated for all dental trauma according to the International Association of Dental Traumatology, however, the practical use of this x-ray in the ED is to rule out alveolar bone fracture, mandible or maxillary fractures when CT is not available or contra-indicated.



Panorex view showing right undisplaced mandible fracture

Pre- and post-procedural imaging is important to ensure improved positioning after a dental fracture, subluxation or intrusion has been reduced.

CT is generally reserved for suspected mandibular or maxillary fractures and are usually not helpful for isolated tooth fractures. Mandible fracture should be suspected if the patient is unable to open their mouth >5cm and/or has a positive [tongue blade bite test](#))

***Pitfall:** one common pitfall is the failure to consider an aspirated tooth or tooth fragment. If not all teeth/tooth fragments can be accounted for, obtain a CXR to rule out an aspirated tooth or tooth fragment.*

Principles of ED dental trauma management

- Dental trauma is often **associated with other facial trauma**; be sure to assess for non-dental facial trauma, including mandibular fracture, maxillary fracture etc in all patients with trauma to the teeth.
- A **mobile tooth** suggests either a root fracture or subluxation and should be splinted in the ED.
- For dental fractures with an associated suspected **alveolar (bone) fracture** (the ridge of the tooth), consider consultation with an oral surgeon in the ED.
- Dental fractures with visible **exposed pulp** should be treated by **capping** (covering the exposed pulp) with calcium hydroxide in the ED.
- **Milk** is preferred over saline to submerge an avulsed tooth in for transport of the tooth.
- The time that a tooth is avulsed is inversely proportional to the chances of reintegration of the tooth after reimplantation; **time is tooth!**
- Do not attempt reimplantation of a complicated crown fracture, fractured root or dental injury with alveolar fracture.
- Factors to increase the suspicion for **non-accidental dental trauma** include lip laceration or bruising, frenulum tear or tongue laceration in a non-ambulatory infant, missing or fractured teeth and/or mandible or maxillary fracture with an implausible mechanism of injury.

Pain management for dental emergencies including dental nerve blocks

For dental trauma in which the pulp is exposed, pain can be treated quickly and effectively with a calcium hydroxide cap application or surgical skin glue application (eg. *Dermabond*, *Swiftset*). Otherwise, for mild to moderate pain, acetaminophen and NSAIDs are recommended. For severe pain, whenever possible, avoid opioids or prescribed in short courses only in patients with low risk of dependence.

Consider a **supraperiosteal nerve block** for temporary relief of severe **maxillary** dental pain.

Consider an **inferior alveolar nerve block** for temporary relief of severe **mandibular** dental pain.

Management of dental avulsions and subluxations

For tooth avulsions >20 mins from the time of injury, **soak the tooth in saline for 30 minutes** followed by a **doxycycline solution (1 mg doxy in 20mL of saline) for 5 minutes** prior to reimplantation and splinting to maximize the chances of revascularization and reintegration of the tooth.

Use **teeth occlusion** as a guide to positioning of the tooth during reimplantation.

Hold avulsed teeth by the crown of the tooth only; avoid handling the root of the tooth whenever possible to maintain the vitality of the periodontal ligament cells.

Pitfall: one pitfall in the management of an avulsed tooth is handling the root of the tooth; this may obfuscate tooth vitality. Always handle the tooth from the crown.

3 Dental splinting methods for dental avulsions and subluxations – wire method, periodontal paste method, N95 nose bridge method

Dental kit wire and composite dental splint method

Using the wires supplied in your ED dental kit, place wire across the tooth in question as well as the 2 adjacent teeth use the curing light to convert the liquid composite material into a solid material to adhere the wires to the teeth, as described in this video:

Periodontal paste dental splint method

Dental Splint (Coe-Pak) Application



1 Coe-Pak is a periodontal paste used to splint loosened or avulsed teeth. Like calcium hydroxide, it is supplied as a catalyst and a base.

2 Mix equal parts of the catalyst and base on the mixing pad supplied with the product.

3 Roll the claylike mixture between your fingers into an elongated roll. Apply lubricating jelly to your gloves prior to handling the product to prevent it from sticking.

4 Dry the teeth and gingiva with gauze prior to application. Press the Coe-Pak into the grooves between the teeth, as well as across the adjacent teeth and gingiva. This type of splint works best when applied to both the front and back surfaces of the teeth, although it is usually sufficient to apply it only to the front.

Care of Core EM <https://coreem.net/core/dental-trauma/>

N95 mask metal nose bridge dental splint method

If a dental kit is not available in your ED, an N95 respiratory mask nose bridge with surgical skin glue is a recognized alternative. [N95 mask metal nose bridge dental splint technique](#).



Care of ALiEM <https://www.aliem.com/trick-of-trade-dental/>

Indications for antibiotics in dental trauma, infection prevention after dental trauma with chlorhexidine

Antibiotics are generally not indicated for isolated dental avulsions or fractures, and should be reserved for open dental alveolar fractures, however **chlorhexidine mouth washes twice daily for 7 days** have been recommended to prevent infectious complications.

Management of complicated dental fractures with exposed pulp using calcium hydroxide

Do not attempt reimplantation of a complicated crown fracture, fractured root or dental injury with alveolar fracture. For complicated dental fractures involving exposed pulp (pink dot on exam), calcium hydroxide should be applied in the ED by mixing the catalyst and the base in an equal ratio, drying the surface of the tooth with gauze or air and applying a small amount to cover the exposed pulp. Follow up with a dentist is recommended for consideration of root canal.

***Pearl:** If calcium hydroxide is not available in your ED, surgical skin glue (eg. Dermabond, Swiftset) is a reasonable alternative for covering exposed pulp in a complicated dental fracture*

Management of acute dental bleeding in the ED

First line: Soak gauze with **tranexamic acid (500mg in 10mL)** and apply pressure by instructing the patient bite down *hard continuously for 30 minutes*.

Second line: If the above method fails, consider injection of 2% xylocaine with epinephrine into the source of bleeding and the surrounding gingiva until blanching of the tissue is visible, followed by repeated pressure by biting down on gauze for the 30 minutes. The analgesia provided allows the patient to apply adequate pressure without causing pain.

Educating patients about post dental trauma risks

At ED discharge is important to set expectations about possible post dental trauma risks that include:

- Tooth resorption complications (progressive loss of part or parts of the tooth)
- Discoloration of tooth (dark tooth as a result of bleeding within the tooth)
- Pulp necrosis
- Loss of tooth
- Requirement for root canal procedure

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