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Ministry of Higher Education  
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# **Management of Dental Emergencies in Children**

A Project Submitted To.  
The college Of Dentistry , University Of Baghdad, Department Of Pedodontics and Preventive Dentistry In Partial Fulfillment For The Bachelor of Dental Surgery .

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## **Certification of the Supervisor**

I certify that this project entitled "**Management of dental emergencies in children**" Was prepared by the fifth-year student **Dalya Ahmed Fakhri** under my supervision. At the College of Dentistry/University of Baghdad in partial fulfillment of the graduation requirements for the Bachelor's Degree in Dentistry.

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**Date:2023\ \**

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# Introduction

The emergency visits can represent an uncomfortable situation for both patient and professional. It is important that the dentist possess sufficient knowledge to make quick decisions, to relieve pain and discomfort, especially when dealing with children **(Ayah , et al.,2012)**.

Emergencies in dentistry can be classified as medical and dental. Medical emergencies occur mainly during dental treatment in patients with a systemic disease **(Chihun , et al.,2019)**.

Often pre-existing medical conditions complicate what might otherwise be a straightforward dental emergency, challenging office-based dentists to manage dental emergencies in a safe manner **(Beau , et al.,2019)**.

Dental emergencies are common problems seen in the emergency department. The dental problems, pain, trauma, and infection are the most frequent complaints. For the most part, dental emergencies are not life-threatening but can be painful and/or cosmetically significant **(Jean and Jason, 2019)**.

Most dental emergency department visits are for non-traumatic dental conditions, and in most cases, emergency department healthcare providers provide prescriptions for pain or antibiotics for infections **(Lee , et al.,2012)**.

The inability to access regular dental care may lead to care seeking at hospital emergency departments **(Scott , et al., 2016)**.



## **Aims of the review**

The aims of this review are to illustrate the dental emergencies in children and the appropriate treatment.

## **Chapter one: Review of literature**

### **1. Definition of dental emergency**

In order to define emergency dental care, American dental Academy defined it as focusing “on the management of conditions that require immediate attention to relieve severe pain and/or risk of infection and to alleviate the burden on hospital emergency departments”. Dental emergencies not representing a threat for severe local/systemic complications should be handled with the least invasive treatments. Literally ‘emergency’ means a serious situation or occurrence that happens unexpectedly and demands immediate action or a condition of urgent need for assistance (Trufanova, *et al.*, 2020).

#### **1.1 Prevalence of dental emergency**

The number of patients visiting with a dental emergency increased annually. Approximately half (50.2%) of all paediatric dental emergency consultations were based on pain due to caries and its consequences. More than a quartile (26.7%) of emergency patients suffered from dental trauma of either primary or permanent teeth. The majority (96.7%) of the patients reported pain. Emergency department visits that were dental related increased from 2000 to 2010. Of all dental presentations to emergency departments (both dental and medical), males were 1.5 to 2.6 times more likely to present than females. (Martins, *et al.*, 2018).

### **2. Dental emergencies of children**

The most common dental emergency visits are:-

#### **2.1 Pulpitis**

Pulpitis is typically categorized as either reversible, or irreversible based on a patient's subjective pain history, clinical and radiographic examination, and

Response to pulp sensibility tests (**Abbott and Yu, 2007**).The Diagnostic indicators to differentiate between them are shown in table (1) .

**Table (1) :**The diagnostic indicator between reversible ,irreversible, pulp necrosis (**Yong and Cathro, 2021**).

	Reversible pulpitis	Irreversible pulpitis	Pulp necrosis
Spontaneous pain	Absent	Present	Possible
Sleep disturbances	Absent	Possible	Possible
Pain to thermal stimuli	Possible	Positive	Absent
Pain lingers to hot/cold	Absent	Present	Absent
Pain relieved by cold	NA	Possible	Absent
Exaggerated pain to EPT	Possible	Positive	Absent
Tenderness to palpitation	Absent	Possible	Possible
Tenderness to percussion	Unlikely	Possible	Likely
Soft tissue swelling	Absent	Absent	Possible
Extraoral swelling	Absent	Absent	Possible
Sinus tract	Absent	Absent	Possible
Periapical radiolucency	Absent	Possible	Likely

**NA:** not applicable .

**EPT:** electrical pulp test.

### **2.1.1 History of pain.**

An accurate history must be obtained of the type of pain, including its duration, frequency, location and spread as well as aggravating and relieving factors (**Kilpatrick, et al., 2003**).

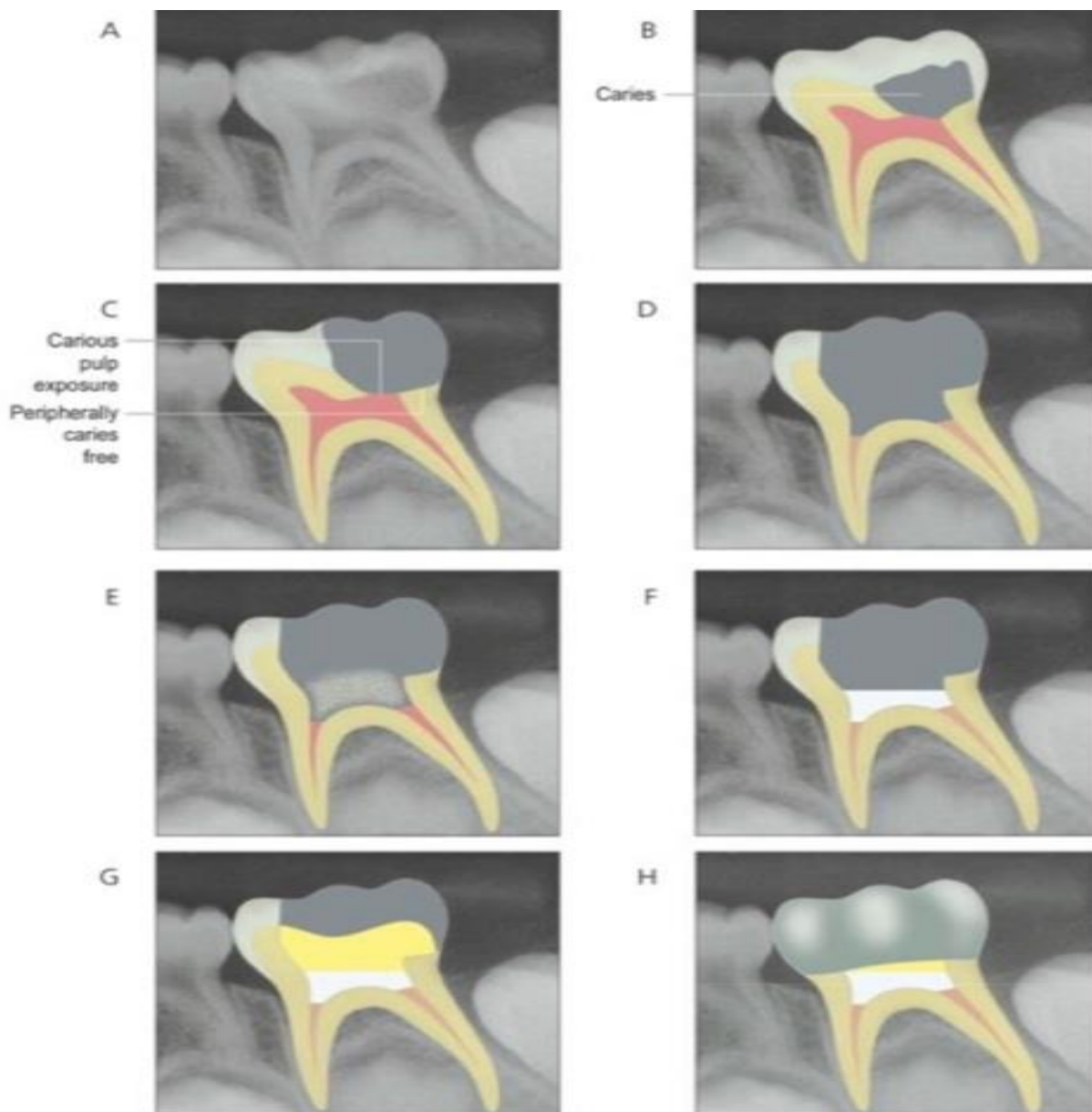
Young children are not good historians. For this group, parents are the ones better prepared to reporting existing symptoms. Stimuli-related responses that cease when the insult is removed (provoked or elicited pain) generally indicate a favorable, reversible status of the pulp which could lead to a more conservative treatment approach. Symptoms of severe, prolonged, spontaneous or nocturnal pain suggest irreversible pulpitis or a dental abscess (**Cameron and Widmer, 2008**).

### **2.1.2 Management**

**2.1.2.1** Management in a primary teeth are:-

#### **A-Full pulpotomy:-**

Is carried out to the orifice level and tissue debris is removed by irrigation with NaOCl, followed by light pressure with a sterile NaOCl soaked cotton pellet. If pulp tissue appears healthy and hemostasis is achieved within 10 min a 1.5–3 mm thick layer of calcium silicate material and permanent restoration can be placed as seen in figure(1). If hemostasis is not achieved in less than 10 min root canal treatment or extraction should be performed (**Yong and Cathro, 2021**).



**Figure (1)** Method of performing a pulpotomy. (A) Preoperative radiograph shows deep carious lesion. Clinical history revealed intermittent symptoms on eating with no history of spontaneous pain. (B) Carious lesion identified relative to dental anatomy. (C) Cavity preparation showing complete removal of peripheral caries. (D) After the tooth is rendered free of caries, the roof of the pulp chamber is removed completely, and the pulp is amputated to the level of the pulpal floor. Haemostasis must be achieved at this point before proceeding. (E) The therapeutic agent is applied to the pulpotomy site. (F) Base is applied to completely seal the pulpotomy site. (G) The tooth is built up with a core material. (H) The tooth is restored with a preformed metal crown) (Cameron and Widmer, 2013).

## **B- Pulpectomy**

Pulpectomy in primary teeth is the removal of the entire pulp tissue and the subsequent filling of the root canals with a suitable resorbable material. Pulpectomy in a primary tooth was historically considered over treatment as compared to a traditional extraction (**Lin, et al.,2011**).

According to (**Marwah, 2018**) the objectives of pulpectomy are:-

- 1-Maintain the tooth free of infection.
- 2-Biomechanically cleanse and obturate the root canals.
- 3-Promote physiologic root resorption.
- 4-Hold the space for the erupting permanent tooth.

According to American Academy of Pediatric Dentistry (2016) pulpectomy is indicated in a tooth with a diagnosis of irreversible pulpitis which is restorable with full coronal coverage post pulpectomy and where hemorrhage control from the root canal orifices during pulpotomy is not obtained indicative of inflamed pulp tissue in the root canals. It is also indicated in primary tooth with an abscess or sinus opening, internal resorption in teeth with no visible perforation and children suffering from hemophilia (**Mutha and sivakumar, 2011**).

The contraindications for pulpectomy are teeth which on the radiograph show advanced internal resorption, excessive external resorption involving more than 1/3 of the root and severe bone loss resulting in mobility , it is not suitable for teeth with underlying cystic lesions and dentitions with non-restorable crowns (**Lin, et al.,2011**).

### **2.1.2.2 In permanent teeth**

The treatment of non-vital pulp include:-

#### **A- Open apex:-**

Apexification is indicated for nonvital permanent teeth with incompletely formed roots The toxic products from the necrotic pulp causes death of the cells (Hertwig's epithelial root sheath) responsible for root growth, which reduces the chance of further root development and apical closure (**Marwah, 2018**).

While regenerative endodontic procedures are defined as biologically based procedures designed to replace damaged structures, including dentin and root structures, as well as cells of the pulp-dentin complex. Regenerative endodontic procedures have become a viable therapeutic approach to save or extend the life of necrotic, immature teeth, as well as to preserve the alveolar bone and maintain optimal function in the long term ( **Zhou, et al., 2019**).

### **B- Closed apex:-**

Root canal treatment or extraction are the only viable treatment options. Radiographs can be useful in estimating caries depth in relation to the dental pulp (**Dogan, et al., 2017**).

### **3. Facial cellulitis**

Cellulitis of odontogenic origin is an acute, deep, and diffuse subcutaneous tissue that spreads through the spaces inflammation of the between the tissue cells to several anatomic regions, tissue spaces, and throughout the aponeurotic plane because of the infection of one or several teeth or due to dental or supportive tissue-associated pathologies as seen in figure (2) (**Batista, et al., 2017**).



**Figure (2)** Maxillary canine fossa cellulitis from an infected dens invaginatus in a first premolar tooth. (**Cameron and Widmer, 2013**).

If cellulitis is detected at an early stage, it usually has a soft and smooth consistency with inflammatory signs, its edges are poorly-defined and, sometimes, the underlying epidermis is not raised up. In the advance stage the area is indurated (**Acta, 2012**). The alveolar bone is the primary local barrier. The

Infection spreads radially and subsequently relates to the periosteum, which is more developed in the mandible than in the maxilla (**Chura, 2010**).

### **3.1 Signs and symptoms of facial cellulitis.**

The sign and symptoms of facial cellulitis are (**Zambrano, et al., 2016**):-

- 1- weakness, discomfort, fever spikes, sweating, thready pulse, leukocytosis.
- 2- sometimes, marked secondary anemia.
- 3- Muscle spasm or immobilization of adjacent muscles causes trismus, torticollis, and stiffness.
- 4- Neural involvement causes pain in the affected sensory nerve and motor nerve paralysis.
- 5- Dysphagia, dysphonia, and aphonia may also occur, depending on the site of infection. .

### **3.2 Treatment**

The treatment options of facial cellulitis are (**Kara, et al., 2014**):

- 1- Root canal therapy was reserved for those patients who had an infected restorable permanent tooth. The pulp chamber was opened, the root canal accessed, and the chamber closed only with a cotton pellet to allow drainage. Once the facial cellulitis had resolved, the final stages of the root canal therapy were completed.
- 2- Extraction was the treatment of choice to remove the source of infection in primary teeth. Incision and drainage were performed when swelling was localized in one area and was fluctuant. If necessary, incision and drainage were coupled with either extraction or root canal therapy. Surgical treatment was performed within the first 24 hours of presentation. Antibiotic treatment was also initiated within 24 hours of initial presentation. which, in some cases, requires the specialized care of a pediatrician and hospital management as seen in table (2).



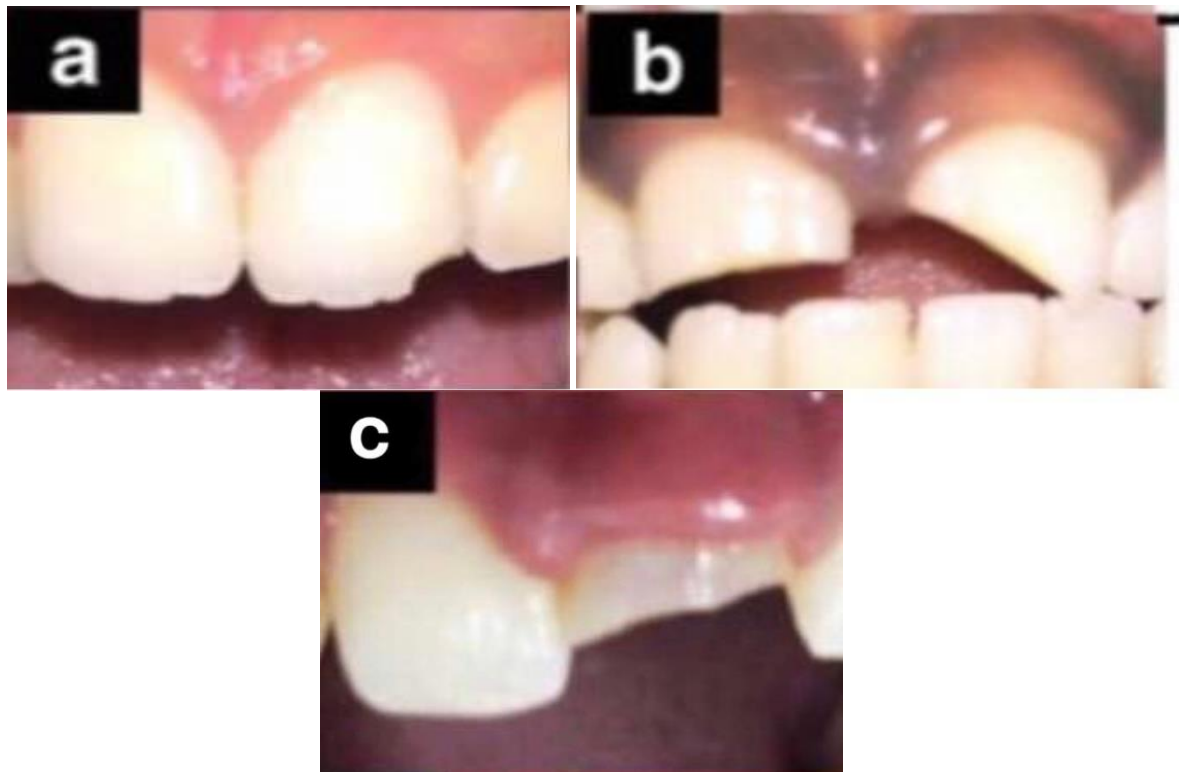
**Table (2): Antibiotic Recommendations ( pediatric emergency department guidelines 2023).**

Condition	Recommended Antibiotic	Duration	Comments
Facial Cellulitis (of dental origin)	IV Amoxicillin/Clavulanic acid. Infant and children (greater than 3 months) severe infection: 25 mg/kg/dose (amoxicillin component) every 6 hours (Maximum 1000 mg/dose amoxicillin component) Adolescent greater than 12 years (and greater than 40 kg): Sever infection: 25 mg/kg/dose (amoxicillin component) every 6 hours (Maximum 2000 mg/dose amoxicillin component)	As per admitting team	Oral dosing may be considered in discussion with the admitting team. Amoxicillin/Clavulanic acid orally 22.5 mg/kg (Maximum 875 mg/dose Amoxicillin component) twice daily.

#### 4. Trauma

Traumatic dental injuries or tooth trauma have a global prevalence of 10–15% as seen in the figure (3). These can occur in isolation or associated with pan-facial or bodily injuries (**Petti, et al.,2018**). Children reporting with traumatic dental injuries may present with moderate to severe symptoms affecting the oral and maxillofacial region. It can affect both primary as well as permanent dentition. Primary anterior teeth remain in mouth from around the age of 7–8 mo to 6–7 y while permanent anterior teeth begin to erupt around the age of 6–8 y. The most common type of traumatic injury to permanent teeth is the enamel fracture

followed by enamel and dentin fracture. Injuries to the primary dentition are usually confined to the supporting tissues i.e., luxation and extra-articulation . However, few studies report that enamel fractures are also common in the primary teeth instead of injuries to the supporting tissues (**Andreson, et al.,2012**).traumatic dental injuries should be considered as an emergency in case of exposure of the dental pulp, tooth avulsion, concussion, luxation and sub-luxation injuries. However, in case of any episodes of amnesia, unconsciousness, drowsiness, vomiting or headache indicating cerebral involvement, the appropriate medical treatment should be rendered before looking into management of traumatic injuries to teeth (**Malmgren, et al.,2012**).



**Figure (3)** a- Enamel fracture , b- Enamel dentine fracture, c- complicated crown fracture (**Nitesh, et al.,2019**).

#### **4.1 Types of Dental Trauma**

Traumatic dental injuries are best classified with their description as seen in table (2)

**Table(3) : Traumatic dental injuries classification (Nitesh, et al.,2019).**

<b>Injury to hard tooth tissue</b>	<b>Injury to tooth supporting structure</b>	<b>Injury to the soft tissue as gums,lips and oral mucosa</b>
Crown fracture-uncomplicated (no blood or pulp exposure)	Concussion (sever pain with no mobility and bleeding)	Contusion
Crown fracture-complicated(blood or pulp exposure)	Subluxation (pain and bleeding from gingival sulcus)	Laceration
Crown root fracture-uncomplicated (no blood or pulp exposure)	Intrusive luxation (tooth moved axially into the bone socket)	Tissue avulsion
Crown root fracture-complicated (blood or pulp exposure)	extrusive luxation (tooth moved axially out of socket and hanging loosely)	
Root fracture (confirmed only in radiograph)	lateral luxation (tooth moved in a direction other than axial)	
Avulsion(complete disjunction of tooth from it's socket)		

## **4.2 Management.**

Dental management of dental trauma (**paediatric emergency department guidelines,2023**).

The management of dental trauma in primary teeth:-

-Concussion: No specific treatment needed in emergency department, simple analgesia as needed.

-Subluxation: No specific treatment needed in emergency department , simple analgesia as needed.

-Extrusive luxation: minor extrusion <3mm in primary tooth, clean area with saline or chlorhexidine. >3mm extrusion – extraction necessary.

-Lateral luxation: A retraction Spontaneous repositioning clean area with saline or chlorhexidine.

While protrusion : Extraction necessary due to pressure placed on permanent tooth by displaced primary tooth.

-Intrusive luxation: No specific treatment, simple analgesia as needed. May require subsequent removal by dentist if impinging on secondary tooth. Clean area with saline or chlorhexidine.

-Infraction: No specific treatment, simple analgesia as needed. Clean area with saline or chlorhexidine.

-Crown fracture: No specific treatment needed, simple analgesia as needed. Clean area with saline or chlorhexidine. Primary tooth fragments should never be bonded back into place.

-Crown root fracture: If fragment very loose/aspiration risk, should be remove.

-Root fracture: If the coronal fragment is not displaced/loose, no treatment is required. Simple analgesia as needed.If the coronal fragment is loose, remove if able, or splinting can be attempted if unable to remove.

The management of dental trauma in permanent teeth:-

-Concussion:No specific treatment needed. Simple analgesia as needed.

-Luxation: No specific treatment needed. Simple analgesia as needed.

-Extrusion luxation: . Clean area with saline or chlorhexidine Reposition the tooth by gently reinserting it into the tooth socket with axial digital pressure. Local Anaesthetic can be considered.Stabilise the tooth using a flexible splint.

-Lateral luxation: Clean area with saline. Using local anaesthesia reposition the tooth by gently re-inserting it into the tooth socket with axial digital pressure.Stabilise the tooth using a flexible splint.

-Intrusive luxation: No specific treatment needed, simple analgesia as needed.

-Infraction: No specific treatment needed , simple analgesia as needed.

-Crown root fracture: If tooth fragment is available, should be gently irrigated and kept in a sterile container (re attachment).

-Complicated crown fracture: complicated crown fractures patients, treatment options include direct pulp capping, partial pulpotomy, cervical pulpotomy, pulpectomy, or extraction, depending on the time between the trauma and treatment of the patient, degree of root development, and size of the pulp exposure.

-Root fracture: If coronal segment avulsed from socket, irrigate thoroughly with saline, avoid touching exposed surface. Irrigate tooth socket with saline. If possible, immediately replant the tooth into the socket with gentle digital pressure, using local anaesthesia if necessary, and splint.

## **5. Avulsion**

Tooth avulsion implies total displacement of an intact tooth out of its socket, the frequency of tooth avulsions following traumatic injuries ranges from 0.5% to 16% in permanent dentition and from 7% to 13% in the primary dentition, it has been suggested that the avulsion of the tooth is briefly favored by the malleability of the alveolar bone and thin structured periodontal ligament (**Kumar, et al., 2017**). The most frequent types of dental traumas in primary teeth are intrusion and avulsion (**Carvalho, et al., 2010**). Developmental disturbances in permanent teeth caused by trauma in their predecessors have a frequency that ranges from 12-74% (**Sennhenn-Kirchner and Jacobs, 2006**).

This high frequency is mainly due to the close anatomical relationship between the apices of primary teeth and their developmental permanent successors. There is almost no indication for the replantation of an avulsed primary tooth. There is more risk of damage to the permanent tooth than there is benefit gained by replacing the tooth (**Cameron and Widmer, 2013**). Avulsed primary teeth are not replanted, a high failure rate because of pulp necrosis,

infection, possible damage to the permanent dentition is given as reasons as seen in figure(4) (de Carvalho Rocha and Cardoso, 2008).



**Figure (4)** no indication for the replantation of an avulsed primary tooth (Cameron and Widmer, 2013).

### **5.1 Avulsion of permanent teeth**

Avulsion of the permanent incisor is the one of most serious emergencies in traumatology (Andreasen, *et al.*, 2018).The permanent anterior teeth apart from being an essential component of the aesthetic zone, is also essential for day to day communication, mastication and psychological and mental health of children, thus keeping this in mind, immediate replantation of an avulsed permanent tooth is often considered as the treatment of choice which can aid in enhanced self-confidence and improved self-perception of the children (Jain, 2017).If cannot be replanted, the tooth should be placed in suitable storage medium. It represents frequent among the age group 8-11 years old At this age, the alveolar bone has limited resilience to extrusive forces, the roots are shorter and thinner, and the ligament fibers are more flexible .Upper central incisors are the most affected teeth, causing thereby aesthetic and functional disturbances, at the origin of inconveniences for the children and their family (Hassan, 2021).

### **5.2 Replantation**

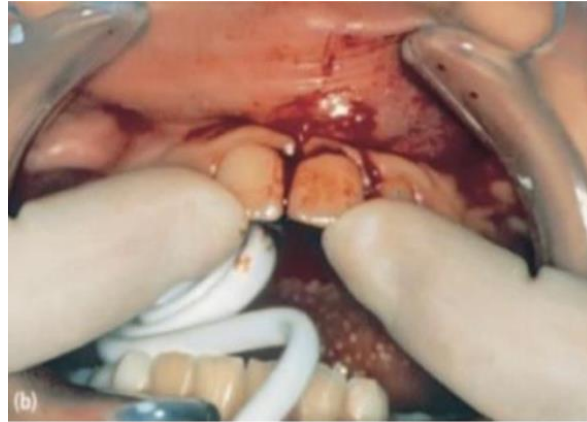
Replantation refers to the insertion and temporary fixation(splinting) of completely or partially avulsed teeth that have resulted from traumatic injury, replantation restores occlusal function and esthetics shortly after injury (Keklikoglu and Asci, 2006).The success of replantation depends on the vitality

of the cells remaining on the root surface and the length of extra oral dry time and the stage of root development complete reestablishment of vitality of periodontal fibers is the prime objective (**Puri, et al., 2011**). The reattachment of periodontal fibers and the formation of Sharpey's fibrils occur about 2 weeks after replantation. If the tooth has been out of the mouth for under 30 minutes, the prognosis is therefore more favorable. Also, if the apical end of the tooth is incompletely developed at the time of the injury, there is a greater chance of regaining pulp vitality after replantation (**Dean, 2021**). Treatment is often complex, time-consuming, expensive and requires multidisciplinary approaches such as endodontic and periodontal treatment, surgery, orthodontic movements and esthetic coronal restoration (**Puri, et al., 2011**).

### **5.2.1 Techniques of replantation**

If an evaluation of the socket area shows no evidence of alveolar fracture or severe soft-tissue injury, the tooth is intact, and only a few minutes have elapsed since the injury, the dentist should replant the tooth immediately. Under the conditions just described, every effort should be directed toward preserving a viable periodontal ligament (**Trope, 2002**). If the tooth was cleanly avulsed, it can probably be replanted without local anesthetic, and obtaining the initial radiograph can also be delayed until the tooth is replaced in the socket and held with finger pressure. The minutes saved may contribute to a more successful replantation. If a clot is present in the socket, it will be displaced as the tooth is repositioned; the socket walls should not be scraped with an instrument. If the tooth does not slip back into position with relative ease when finger pressure is used, local anesthesia and a radiographic evaluation are indicated. Local anesthetic should also be administered when fractured and displaced alveolar bone must be repositioned before the tooth is replanted. Soft-tissue suturing may be delayed until the tooth has been replaced in the socket; however, the suturing should be performed to control hemorrhage before the tooth is stabilized with a

bonded splint. the avulsed tooth is replaced in the socket with gentle finger pressure as seen in figure (5) (Koch, *et al.*, 2017).



**Figure (5)** The avulsed tooth is replaced in the socket with gentle finger pressure (Koch, *et al.*, 2017).

## 6. Dry Socket or Alveolar Osteitis

postoperative pain at the extraction site increasing in severity at any time between 1 and 3 days after extraction accompanied by a totally or partially disintegrated clot of blood within the alveolar socket with or without halitosis. There is severe, persistent throbbing pain in and around the extraction socket radiating in different adjacent parts ,that is not easily relieved by analgesics as seen in figure (6) (Cho, *et al.*, 2017).



**Figure (6)** A dry socket is fully covered with healing epithelium, but a septum of exposed bone is visible inside the socket. (Mamoun, 2018).

### 6.1 Management

The dental management of dry socket are (Jesudasan, *et al.*, 2015)



1-socket should be irrigated with warm normal saline and all degenerating blood clot is removed. Sharp bony spurs should be either excised with rongeur forceps or smoothed with wheel stone.

2- A loose dressing, composed of zinc oxide and oil of cloves on cotton wool, is stuffed into the socket. It must not be packed tightly or it may set hard and be very difficult to remove. A pack, composed of Whitehead's varnish on ribbon gauze can also be used.

3-Analgesics like Non-steroidal anti inflammatory drugs or narcotic based preparations such as acetaminophen with codeine, hydroxycodone or oxycodone and hot saline mouth baths are prescribed and arrangements are made to see the patient again in 3 days.

## **7. Dental cyst**

Cyst formation in children may cause expansion and resorption, delayed eruption, malposition, enamel defects, or damaging of the developing permanent successors ( **Toomarian, et al., 2011**).

### **7.1 Types of dental cyst**

There are several types of dental cyst (**Nilesh, et al., 2015**) :-

- 1- Radicular cyst.
- 2- Follicular cyst.
- 3- primordial cyst.
- 4- Paradental cyst.
- 5- Residual cyst.
- 6-Eruption cyst.

### **7.2 Management**

Treatment of Dental Cysts in Children:-

The type of treatment can be varying depending on the severity of the cyst, And the stage of that. Discoloration or loosening of the tooth may prompt patients to visit the dentist to confirm the clinical diagnosis. Hence, a radiological

examination is an important tool to provide valuable information. Here are four main methods of professional therapies to consider. Typically, eruption cysts do not require treatment. Usually, teeth eruption happens within a few days although most of them burst spontaneously (**Karimi, 2019**). If the eruption cyst remains in the mouth for more than a few weeks, the dentist will make an incision on the cyst to allow the teeth to emerge from the gum. Depending on the level of child anxiety, the dentist can do this under local anesthesia. This is the best treatment that is very simple and does not have any serious consequences. Cystectomy is a type of surgery that is used to remove part of the root (its damaged part) and cyst removal. This surgery is performed for relatively small cysts that affect at most two teeth. This procedure is performed by creating an incision on the gum. The advantage of this method is that the teeth are not damaged, and retained. Hemisection, in comparison with cystectomy, is less lenient or in other words, more aggressive than it is. In this procedure, all injured roots, along with the damaged parts of the tooth crown adjacent to it, are completely removed. The last method is the most aggressive way in which the developed cyst is completely removed. This method is used only if the tooth is severely damaged so that it is completely impossible to preserve it. It needs to be explained that the choice of treatment method does not relate to the patient's or the physician's request; it is the size and appearance of the cyst which determines the treatment method. Appropriate and timely treatment almost always leads to complete patient recovery without any serious consequences (**Syakriani, et al.,2022**).

## **8. Pericoronitis**

It's also known as operculitis, is defined as an inflammation of the soft tissue surrounding the crown of an impacted or semi-impacted tooth as seen in figure(8) .Incidence of pericoronitis is 4.92%, and 95% of cases occur with the lower third molar (**Katsarou, et al., 2019**).



**Figure (7) Pericoronitis** Images demonstrate a partially erupted third molar covered by soft tissue. (**Schmidt, *et al.*,2021**).

## 8.1 The signs and symptoms

The signs and symptoms of pericoronitis are:-

pain, swelling and tenderness along with difficulty in mouth opening and discomfort in swallowing. Lymphadenitis of the associated lymph nodes, fever, malaise, unpleasant breath/taste accompanied by purulent exudate of the operculum revealed upon palpation (**Bradshaw, *et al.*, 2012**).

## 8.2 The dental management

The dental management of pericoronitis are:-

### A. Local intervention ( **Asok, *et al.*, 2018** ) :-

- 1- Irrigation of pericoronal space with a sterile solution (aqua pro injection, saline, antiseptics for mucosa, e.g., hydrogen peroxide or chlorhexidine).
- 2- Mechanical removal of plaque and debris (debridement) from the pocket using periodontal instruments and swabs gently.
- 3- Irrigation and debridement may be combined to achieve better results.
- 4- Any collection of pus should be drained.
- 5- Traumatic occlusion, if present, should be prevented by soft tissue or occlusal adjustment. Extraction of antagonist tooth may be considered.
- 6-The patient should be instructed in oral hygiene involving gentle and careful mechanical cleaning of the affected area and mouth rinsing with antiseptics (e.g.,, 0.12–0.2% chlorhexidine two times daily for 1 min).
- 7-Ozone therapy may be an adjunct to local therapy, but there is no evidence of its effectiveness.

### B. Antibiotics:-

It's indicated adjunct to local treatment in infection spread or systemic involvement. The Prescription based on guidance by the Faculty of General Dental Practice in the United Kingdom issued in 2020 (**Palmer, *et al.*, 2020**).

### C. Photodynamic therapy:-

Antimicrobial photodynamic therapy is a cytotoxic non-invasive treatment option with a low tendency to induce drug resistance. Briefly, this method includes an application of a photosensitizing agent in the target tissue and its activation by laser light of a specific wavelength in the presence of oxygen. Upon irradiation, the photosensitizer molecules undergo excitation transferring energy to the oxygen molecule that consequently forms oxygen free radicals. These free radicals are highly cytotoxic and help to eliminate bacteria (**Akram, *et al.*, 2015**).

## **9. Post extraction complication**

The most common complication after teeth extraction are:-

### **9.1 Post Extraction Pain**

Post extraction pain may result from incomplete extraction of the tooth, laceration of the soft tissues, exposed bone, infected sockets or damage to adjacent nerves. Treatment is by eliminating the cause and by prescribing analgesic drugs. A randomized trial have shown that children who received intrathecal morphine intraoperatively had reduced pain and opioid requirements in the postoperative period (**Villavicencio, *et al.*, 2022**).

### **9.2 Post operative Trismus**

Trismus or inability to open the mouth due to muscle spasms may complicate oral surgical procedures, particularly difficult dental extraction.

#### **9.2.1 Etiology of post operative Trismus**

It may be caused by (**Mamoun, 2018**):-

1-Postoperative edema, hematoma formation, or inflammation of the soft tissues.

2- An inferior dental block injection may be followed by a painless, severe and progressive trismus without swelling, due to either hematoma formation (which may undergo fibrosis), caused by penetration of a small blood vessel or introduction of infection, or due to trauma to the medial pterygoid muscle causing spasm.

3- Damage to temporomandibular joint due to excessive downward pressure or keeping the patient's mouth wide open for a longer period, or infection in pterygomandibular space and or in submasseteric space can also lead to trismus.

### **9.2.2 Management**

Intraoral application of heat by the use of short wave diathermy or the use of hot saline mouth baths, analgesics, antibiotics, muscle relaxants, application of glycerine magnesium sulphate dressing, physiotherapy or surgical decompression are few methods to improve trismus. It will recover with time, usually 6 weeks but may be improved more quickly by gently opening the mouth under general anesthesia (**Borle, 2014**).

### **9.3 Postoperative swelling**

Swelling is caused by poor surgical technique, use of blunt instruments, pulling on the flaps to gain access and inadequate drainage, entangled burs in the soft tissues, tightly placed sutures or surgical trauma as seen in figure (8).



**Figure (8)** Extraoral swelling seen in a young boy due to infected lower second right molar (**Rao, 2012**).

If the patient describes rapid onset of swelling that is hard, then this is usually a hematoma . If swelling is of delayed onset, but is persistent, hard and painful, then there is often a collection of pus, which can be very painful with

raised skin temperature along with redness of the overlying tissues and presence of fever (Mitchell, 2014).

### **9.3.1 Management**

Inflammatory oedema can be minimized by following the aseptic principles, gentle tissue handling, judicious bone cutting and use of coolant, proper irrigation and removal of necrotic debris and food particles, loosely placed sutures, application of external hot moist packs for 30 minutes per hour, use of warm isotonic saline mouth rinses every 3 to 4 hours, and antibiotics. If fluctuation is present, then pus should be evacuated prior to the institution of antibiotic (Peter, *et al.*, 2019). Paracetamol and Nonsteroidal anti-inflammatory drugs are prescribed for pain control which may be used in combination with opioids or corticosteroids, antibiotics, antibacterial mouthwashes like Chlorhexidine, topical gels containing antimicrobial agents, and cold application are preferred treatment options. Reduced temperature causes vasoconstriction and reduces post operative swelling. Pressure dressings are also beneficial in limiting post operative swelling. Once swelling has reached its maximum (usually after 24 to 48 hours), heat, in the form of moist compresses, should be applied (Cho, *et al.*, 2017).

### **9.4 post extraction bleeding or hemorrhage**

After tooth extraction, it is normal for the area to bleed and then clot, generally within a few minutes. It is abnormal if bleeding continues without clot formation, or lasts beyond 8 to 12 hours; this is known as post extraction bleeding. Such bleeding incidents can cause distress for patients, who might need emergency dental consultations and interventions. The causes of post extraction bleeding can be local, a systemic disease, or a medication (Mohamed, *et al.*, 2021). may be due to infection which destroys the blood clot. Bleeding may be due to some local causes like trauma, laceration, friable granulation tissue, clot dislodgment, infection, hemorrhagic lesions. incidence of post-extraction bleeding varies from 0% to 26% (Sumanth, *et al.*, 2016).

### 9.4.1 Management

Proper preoperative measures like family history, past dental history like history of bleeding, past medical history like platelet disorders associated with liver disease or hypertension, drug history such as whether the patient is on oral anticoagulants are required. Peri-operative measures like careful handling of the tissues to avoid unnecessary trauma are to be taken (**Claire, et al.,2020**). If a patient comes back with hemorrhage, his general condition is then rapidly assessed. Monitor vitals for the sign of hypovolemia periodically. The patient's mouth should be washed out with cold water and the adherent clot is to be removed with a gauze swab . Generalized oozing from the soft tissues usually can be arrested by manual pressure or a gauze pack placed over the area . Sutures may be placed across the socket . If such pressure fails to control the blood flow it is obvious that the source of haemorrhage originates within the bony cavity and some sort of socket pack is required like Whitehead's varnish on ribbon gauze or some absorbable haemostatic agents such as gelatin sponge or bone wax may be applied over the site of haemorrhage,.The patient should receive supportive treatment including warmth, administration of fluids by mouth, drugs to relieve anxiety and pain ( **Borle, 2014**).

## **Chapter two: Conclusion**

1- Knowledge of the etiological and clinical characteristics of emergency dental trauma could help us to treat them and make specific preventive measures.

2- The low level of awareness among general public and medical practitioners often leads to delay in seeking treatment which often leads to pain, severe symptoms and poor prognosis.

3- Timely and effective care is important in the management of dental injuries, as poor outcomes with delayed treatment.

4-Dental infections contribute a significant burden of emergency department dental presentations.

5-There are likely to be several factors contributing to severe complications of emergency dental injury included patient education, anxiety, and cost.

6- In the coming years, advocates for oral health will have to consider other innovative ways to increase access to dental care in order to decrease dental care utilization in hospital emergency departments.



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