ENDODONTIC EMERGENCIES
INTRODUCTION

- The proper diagnosis and effective management of acute dental pain is possibly one of the most rewarding and satisfying aspects of providing dental care.
Definition

- An endodontic emergency is defined as pain and/or swelling, caused by various stages of inflammation or infection of the pulpal and/or periapical tissues.
- *Defined* as an unscheduled visit associated with pain or swelling from pulpoperiapical pathoses requiring immediate diagnosis and treatment.
Etiology (Classification)

1. Before treatment
2. During treatment
3. After treatment
Before treatment

1. Pulpal pain
   1. Reversible pulpitis
   2. Irreversible pulpitis
2. Acute alveolar abscess
3. Cracked tooth syndrome
4. Traumatic injuries
   1. Crown fracture with vital pulp exposure
   2. Horizontal root fracture with mobility
   3. avulsion
Patients undergoing treatment

1. Recent restoration
2. Periodontal treatment
3. Exposure of pulp
4. Crown/root fracture
5. Pain during endodontic treatment
   - acute apical periodontitis
   - Phoenix abscess
After treatment

1. High points
2. Overfilling
3. Underfilling
4. Fracture of tooth
5. Missed root canal
Reversible pulpitis

It is a mild to moderate inflammatory condition of the pulp caused by noxious stimuli in which the pulp is capable of returning to the uninflamed state following removal of the stimuli.

- **Causes** – Caries, Trauma from occlusion, non-carious lesion

- **Treatment** –
  - Deep caries - sedative dressing
  - High points - Check for occlusion, and relieve high points
  - Desensitizing paste – on-carious lesion
Irreversible pulpitis

Irreversible pulpitis is a *persistent* inflammatory condition of the pulp, symptomatic or asymptomatic, caused by a noxious stimulus.
Irreversible pulpitis

- **Treatment**-

1. Complete removal of the pulp or pulpectomy and the placement of an intracanal medicament to act as a disinfectant or obtundent (endodontic therapy)
   - Anterior teeth – pulpectomy
   - Posterior – formocresol pulpotomy/corticosteroid paste
2. Surgical removal (Extraction) should be considered if the tooth is unrestorable.
Acute alveolar abscess

- An acute alveolar abscess is a *localized collection of pus* in the alveolar bone at root apex of tooth following death of pulp, with extension of infection through apical foramen into the Periradicular tissue.
Symptoms: (LOCAL)

- First symptom is slight **tenderness**
- Later patient has **severe throbbing pain** with **small swelling** on the soft tissue overlying.
- The tooth becomes more painful, elongated and **mobile**.
- As infection proceeds swelling become more **pronounced** beyond original site.
- If untreated infection may progress to **osteitis, periostitis, cellulitis and osteomyelitis**.
Symptoms: (LOCAL)

- When *maxillary anterior* teeth is involved, swelling of *upper lip* may extend to both eyelids.
- When *maxillary posterior* teeth are affected the *cheek may swell* to immense size distorting facial features.
- In *mandibular posterior* teeth the swelling extend to/or *around border of jaw* into submaxillary region.
Acute alveolar abscess

Treatment:

- Consist of establishing drainage and controlling systemic infection.
  - If swelling is **diffuse**, *antibiotic cover* is prescribed along with hot mouth rinse.
  - Once pus is localized, **incision and drainage** is instituted.
  - **Local anesthesia is contraindicated** in acutely inflamed tissue
- Once the swelling and pain subside, endodontic treatment is done.
Incision and drainage

Image from Ingle. Textbook of endodontics
Cracked tooth syndrome

- Patient experiences pain on chewing
- Similar to irreversible pulpitis
  - Diagnosis: bite test - rubber wheel, crackfinder tips
  - Transillumination
  - Dye
Special tests – Bite test/occlusal pressure test/Wedge test

- Help isolate the offending tooth if a patient is complaining of biting pain
- Biting pain may be due to apical periodontitis, apical abscess, and incomplete tooth fractures (infractions, Cracked tooth syndrome)
Bite test/occlusal pressure test

- Methods:
  - Biting on an orangewood stick, a Burlew rubber disk, or a wet cotton roll.
- devices:
  - Tooth Slooth
  - FracFinder
Special tests – Dye /Stain test

- To determine the presence of a crack in the surface of the tooth
- Place colouring agent /dye (Food colouring agent or methlene blue) on dried occlusal surface, before the biting/wedge test
Special tests – Transillumination/Fibre optic transillumination

- A transillumination device can be used to confirm the presence of cracks underneath any restorations and to determine the extent and depth of the cracks.
- By shining a bright light on the buccal or lingual surface of the tooth.
- For a tooth that is not cracked, the light will shine through to the opposite surface without any interruption.
Cracked tooth syndrome

- Treatment
  - Depends on whether or not the crack is involving the pulp
  - Temporary measure- stabilize/splint with orthodontic band
  - Endodontic treatment
  - Extraction, if extending sub-gingival
Traumatic injuries

- Elli’s class III fracture
- Horizontal root fracture
- Avulsion
Elli’s class III fracture

- Treatment

  - Root apex closed

  - Open Root apex / IMMATURE

  - Anterior - pulpectomy
  - Posterior – pulpotomy

  - Calcium hydroxide/MTA pulpotomy
    - apexogenesis
    - RCT
Image from Tsokibos. Traumatic injuries
Horizontal root fracture

- Arch of mobility
  - More mobility - if fracture line more coronally
  - Less mobility – if fracture line middle third
  - Least – if fracture line apical third

Image from Anderson . Atlas of traumatic injuries
Horizontal root fracture

- Prognosis

- Closer to apex – favorable
- At level or below alveolar crest - poor
- Above alveolar crest - excellent prognosis
Horizontal root fracture

- **Treatment**
  - Stabilize/splint the tooth with orthodontic wire, arch bar/acid etch splint
  - Duration – 6-12 weeks
  - Evaluate periodically by doing vitality test
  - Root canal initiated if tooth becomes non-vital
Avulsion

- Displacement of tooth out of socket
Avulsion

- Patient/parent instruction
  - To report to dentist office immediately with tooth/tooth fragment
  - Wash the tooth in running tap water
  - Hold the tooth by crown NOT root
  - Do NOT scrub the root portion
  - Place the tooth in transport media- milk, patients saliva, patient’s vestibule/below tongue
  - IDEAL media- HBSS (Hanks balanced salt solution)
Avulsion

- Clinical management
  - Radiograph taken to check any alveolar fracture or any fragment of tooth in soft tissue/socket
  - Gently irrigate the socket with saline
  - Do NOT curette the socket
  - Treat the tooth with tetracycline or 2% stannous fluoride, to enhance the attachment and reduce the resorption
Avulsion

- Gently place the tooth back in socket using finger pressure or asking the patient to bite gently.
- Once alignment is confirmed, splint or stabilize the tooth with acid etch splint.
- Relieve the tooth from occlusion.
- Prescribe soft diet, tetanus booster dose and antibiotic coverage.
- Periodically evaluate the vitality and do Root canal treatment if tooth becomes non-vital.
● Duration of splinting
  ● 7-10 days only
  ● Or else tooth may be ankylosed
  ● Flexible splint preferred than fixed ones
avulsion

- Prognosis
  - Prognosis is good if tooth is replanted within 30 min
  - Factors affecting prognosis
    - PDL preservation – more dry storage- poor prognosis
    - Time lapsed between injury and replantation
    - Tooth kept moist or dry
Replantation – Healing
Healing following replantation

- Healing of periodontal membrane
  - Reattachment (normal PDL present)
  - New attachment (Partial PDL)

- Resorption – extensive loss of PDL or necrosis of PDL
Root resorption

- **Surface** – occurs during repair process, transient
- **Replacement** – ankylosis – bone and tooth fused
- **Inflammatory** – occurs if pulp is necrotic

Radiodrafically radiolucentencies are observed.
Emergencies in patients undergoing treatment

- Recent restoration
  - High filling
  - Microexposure of pulp
  - Thermal/mechanical injury of pulp
  - Inadequate pulp function
  - Chemical irritation
  - Galvanism

- Treatment – depends on status of pulp
- Prevention- careful and judicious operative procedures
Emergencies in patients undergoing treatment

- Patients on periodontal problems
  - Occasionally due to periodontal procedures, there is exposure of lateral canals leading to pulpal/periodontal pathosis

- Treatment
  - Root canal treatment

- Sensitivity
  - due to root planning, cementum is removed exposing the dentin and causing sensitivity
    - Treatment- Desensitizing agents
Emergencies in patients undergoing treatment

- Exposure of pulp
  - Carious
  - Mechanical

- Crown-root fracture
  - Occurs when a weakened tooth is left in function.
  - Fracture results in contamination of root canal causing failure and pain
  - Treatment- depends on restorability of tooth
● Endodontic – pain as a result of over – instrumentation
  ● Acute apical periodontitis- due to
    ● Traumatic occlusion
    ● Over instrumentation
    ● Forceful irrigation
    ● Placing too much intracanal medicament
  ● Treatment- remove the colsed dressing
  ● Irrigate the canal and dry
  ● Seal the root canal with sedative dressing like, eugenol or cresatin, or corticosteroid with isopropyi alcohol paste
DEFINITION:

- This condition is an acute inflammatory reaction superimposed on an existing chronic lesion, such as a cyst or granuloma.
PHOENIX ABSCESS/ RECRUDESCENT ABSCESS
(Acute exacerbation of a Chronic Lesion)

ETIOLOGY:

- Influx of necrotic products from a diseased pulp, or bacteria and their toxins, into apparently dormant lesions (chronic periradicular diseases)
- Lowering of the body's defenses in the presence of
  - bacteria from the root canal or
  - the mechanical irritation during root canal instrumentation
In the granuloma or cyst and the adjacent periradicular tissues → areas of liquefaction necrosis with disintegrating polymorphonuclear neutrophils and cellular debris (pus).

These areas are surrounded by infiltration of macrophages and some lymphocytes and plasma cells.
SYMPTOMS:

- At the onset, the tooth may be tender to the touch.
- As inflammation progresses, the tooth may be elevated in its socket and may become sensitive.
- The mucosa over the radicular area may be sensitive to palpation and may appear red and swollen.
PHOENIX ABSCESS/ RECRUDESCENT ABSCESS

DIAGNOSIS:

- Most commonly associated with the \textit{initiation of root canal therapy} in a completely asymptomatic tooth.
- \textbf{Radiographs} show well-defined periradicular lesions.
- The patient may have a \textit{history} of a traumatic accident
- \textbf{Vitality tests} : negative
DIFFERENTIAL DIAGNOSIS:

- Acute alveolar abscess.
- This tooth can be distinguished from a tooth with painful pulpitis by testing for pulp vitality.
TREATMENT:
- The treatment of acute exacerbation of a chronic lesion, which is in emergency, is the same as that of an acute alveolar abscess.

PROGNOSIS:
- The prognosis for the tooth is good once the symptoms have subsided.
others

- Overfilling of root canal
- Underfilling of root canal filling
- Missed root canal