Management of Endodontic Emergencies

An endodontic emergency is defined as pain or swelling caused by various stages of inflammation or infection of the pulpal or periradicular tissues. The cause of dental pain typically originates from caries, deep or defective restorations, or traumatic injuries. Sometimes occlusion-related issues, such as cracks, can also mimic acute dental pain.

Any irritation to the tissues results in inflammation, which is caused by the release of tissue inflammatory mediators. These mediators induce vasodilatation, increase pressure on the tissues, and cause pain.

Chemical mediators cause pain by lowering the pain threshold of the sensory nerve fibers or by increasing vascular permeability and producing edema. Increased fluid pressure resulting from edema directly stimulates the pain receptors.

The classification of endodontic emergencies according to (P Carrotte) includes:

A. Pretreatment:

The patient comes to the clinician for the first time with pain, swelling, or injury. Conditions included:

1. Dentin hypersensitivity
2. Symptomatic reversible pulpitis
3. Symptomatic irreversible pulpitis
4. Symptomatic apical periodontitis
5. Acute apical abscess
6. Traumatic injury
7. Cracked tooth syndrome

B. Patients under treatment

An emergency that has occurred during endodontic treatment

1. Mid-treatment flare-up
2. Exposure of pulp
3. Fracture of a tooth
4. Recently placed restoration

5. Periodontal treatment
6. Hypochlorite accident
7. Tissue emphysema

C. Post-endodontic treatment

An emergency that occurs after the completion of endodontic treatment

1. Over-instrumentation
2. Overextended obturation
3. Underfilling
4. Fracture of the root
5. High spot of coronal restoration

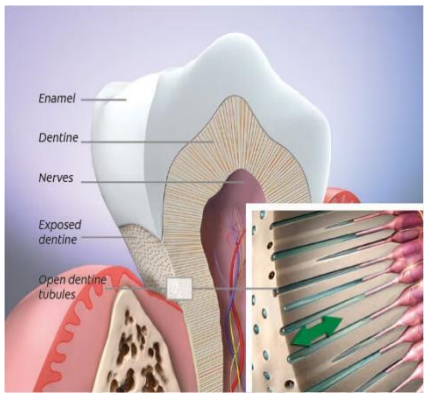
Dentin hypersensitivity

Dentin hypersensitivity is defined as "sharp, short pain arising from exposed dentin in response to stimuli typically thermal, chemical, tactile, or osmotic and which cannot be ascribed to any other form of dental defect or pathology. Dentin may become exposed by two processes: either by loss of covering periodontal structures (gingival recession) or by loss of enamel.





Two main principal treatment options are plugging the dentinal tubules to prevent the fluid flow and desensitizing the nerve, making it less responsive to stimulation. In addition, replacing lost tooth structure with a composite restoration.



Symptomatic reversible pulpitis

It is characterized by the following features:

1. Localized inflammation of the pulp
2. Lowering of threshold stimulation for Aδ nerve fibers
3. Exaggerated, nonlingering response to stimuli

Management

1. Removal of the cause; in case of deep caries, excavate the caries and place a restoration.
2. Recontouring of recently placed restoration, which causes pain.
3. Removal of restoration and replacing it with a sedative dressing if painful symptoms still persist following tooth preparation.

Symptomatic irreversible pulpitis



If the inflammatory process progresses, irreversible pulpitis can develop.

Pain from symptomatic irreversible pulpitis is often an emergency condition that requires immediate treatment. These teeth exhibit intermittent or spontaneous pain, whereby exposure to extreme temperatures will elicit intense and prolonged episodes of pain, even after the source of the stimulus is removed.

Management

1. Clean the root canal(s) to the working length.
2. Place a suitable medicament in the pulp canal and chamber (ex. Calcium hydroxide).
3. Close the access opening with a temporary filling.
4. Check occlusion of the tooth.
5. Prescribe a pain analgesic.

Symptomatic apical periodontitis

It is an inflammation of the apical periodontal tissue caused by the extension of pulpal infection periapically. It is characterized by the following features:

1. The tooth from its socket because of build up in fluid pressure in the periodontal ligament.
2. Discomfort on biting.
3. Sensitivity to percussion (hallmark diagnostic test).

<u>Management</u>

1. Relieve occlusion.
2. Access opening preparation.
3. Total pulp extirpation.
4. Cleaning the root canal.
5. Thorough irrigation and dryness.
6. Placement of intracanal medicament as Calcium hydroxide.
7. Close the tooth with a temporary filling material.
8. Prescribe analgesics.



Acute periapical abscess

Extrusion of bacteria from the root canal to the periapical area induces infection, ending in the formation of a collection of pus. An acute periapical abscess is characterized by the following features:

1. Clinically, a swelling is evident with pain and a sensation of tooth elevation.
2. Radiographic evidence varies in the size of the lesion.
3. Systemic fever.





Management

1. Pulp debridement of its contents.
2. Incision and drainage (if swelling is present)
3. Do not leave the tooth open between appointments.
4. Antibiotics may be prescribed only if systemic features are present, such as fever.
5. Relieve the tooth from occlusion.
6. NSAIDs and analgesics should be prescribed to control post-operative pain.

Local anesthesia injection near the swelling region is contraindicated to be used because:

A. Pain caused by the injection in the distended area.
B. Chance of spread of microorganisms.
C. Ineffectiveness of local anaesthetics.

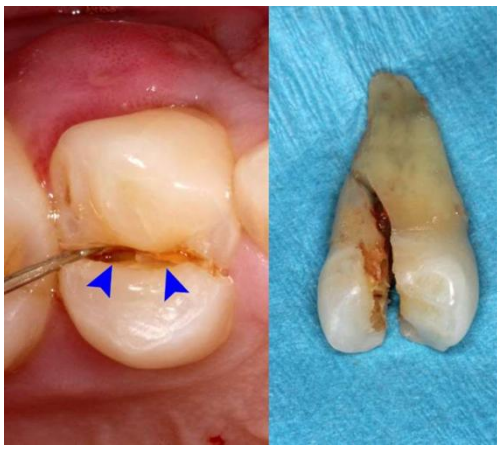
Therefore, block techniques can be good alternatives for anesthesia.

Cracked tooth syndrome

It is an incomplete fracture of a tooth with vital pulp. It is commonly seen with teeth with large restorations. Pain is experienced when the patient chews a cotton roll laterally.

Management

1. Immediately reduce the occlusal contact with the cracked area.
2. Analyze the extent of the crack to preserve the pulpal health.
3. If the fracture involves the crown portion only, full crown coverage is required.
4. If the pulp is involved and the crack is superfacial to the alveolar bone, endodontic treatment is necessary.
5. If the crack is below the alveolar bone, extraction of the tooth is necessary.



Intra-treatment flare-up

A flare-up is the occurrence of pain, swelling, or both during the course of root canal treatment.

Risk factors contributing to flare-ups:

A. Over-instrumentation and over-obturation.
B. Inadequate debridement.
C. Periapical extrusion of debris.
D. Preoperative pain, percussion sensitivity, and swelling.
E. One visit to endodontics in cases of acute apical periodontitis.
F. Retreatment.
G. Apprehension.
H. History of allergies.

Management

1. Reassurance of the patient
2. Complete debridement of the root canal with no over-instrumentation or extrusion of debris.
3. Establishment of drainage if pus is present.
4. Relief of occlusion
5. Calcium hydroxide intracanal medication.
6. Analgesic and antibiotic prescription.

Hypochlorite accident:

It can result from forceful injection of hypochlorite, irrigation of the tooth with a wide apical foramen, immature apex, or apical resorption.

Edema, ecchymosis, tissue necrosis, and paresthesia are commonly seen after a hypochlorite accident. Mostly patients recover within 7–10 days, but scarring and paresthesia may take a long time to heal.



Management

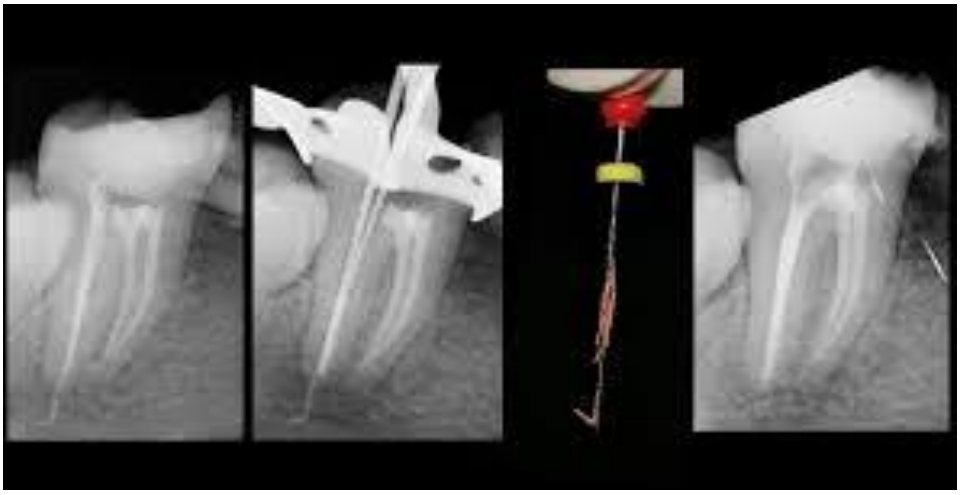
1. Immediate aspiration and application of icepacks.
2. Since infection, because of tissue destruction, can spread, prescribe antibiotics, analgesics, and antihistaminics.
3. In severe cases, steroids and hospitalization for surgical wound debridement are also indicated.
4. Home care instructions are given to patients, such as cold packs to minimize pain and swelling, followed by warm packs (after 24 h) to encourage healing.

Over-extended treatment beyond the apex.

Any extension of an instrument or filling material induces acute inflammation and, in the presence of extruded debris, will cause infection. Pain is magnified because of the limited area between the bone and the tooth.

Steps of treatment

1. Care should be taken to ensure not to extend instrumentation beyond the apex.
2. Re-instrumentation to the exact working length should be done to ensure formation of an apical stop area to prevent the extrusion of gutta-percha.
3. If gutta-percha is extended beyond the apex, then retreatment should be performed with care to remove the over-extended gutta-percha.
4. An analgesic should be prescribed.



Fracture of a tooth

During the course of treatment or after it, the tooth may be subjected to force, and it might fracture. The treatment depends on the extent of the fractured area (in the crown or including the root). The steps of treatment resemble those of the cracked tooth syndrome.

Management of Post-obturation Emergencies

Most of the time, there is some discomfort following obturation, which subsides in 2–5 days. To manage post-obturation endodontic emergencies, the following can be done:

1. Reassure the patient
2. Prescribe analgesics
3. Check occlusion
4. Do not retreat randomly. Retreatment is done only in cases of persistent, untreatable problems.

