

MANAGING ENDODONTIC EMERGENCIES

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Endodontic emergencies usually result from inflammatory reactions in pulpal or periapical tissues. They constitute a major part of all dental emergencies^{1,2} and require immediate diagnosis and treatment. In general, emergencies are unscheduled visits by patients in severe pain, under emotional distress and seeking immediate relief. Although the endodontic emergency is disruptive and often inconvenient, proper management is satisfying to the dentist and much appreciated by the patient; improper treatment is frustrating and stressful.

Emergencies are of three types: pretreatment, flare-ups, and postobturation. There are similarities among the three, but also differences in causes and management.

In the pretreatment emergency, the microorganisms in carious

enamel or dentin or within an infected root canal constitute one of the major sources of pulpal and periapical irritation. Gram-negative anaerobic bacteria, namely bacteroides species, cause some clinical symptoms of pulpal and periapical pathosis.^{3,7}

In addition to microorganisms, mechanical and chemical irritation of pulp can also result in inflammation. In interappointment flare-up—besides bacteria—irritation of pulpal and periapical tissues during instrumentation and overextension of the filling materials beyond the root canal system are the main mechanical causes of pulpal and periapical inflammation. Chemical irritants of pulp tissue include cleaning, sterilizing and desensitizing substances. Irrigants and chelating agents used during cleaning and shaping as well as intracanal medications used between

appointments and some substances in obturating materials can also irritate the periapical tissues.¹

As in connective tissues elsewhere in the body, irritation of pulp and/or periapical tissues causes tissue injury, resulting in the release of chemical substances that initiate inflammatory responses to eliminate the irritants and provide an environment for proper healing. Unlike other connective tissues in which irritation causes pain, heat and redness, pain or swelling are the only signs of pulpal and/or periapical inflammation.

The chemical mediators of inflammation responsible for these local responses are derived either from cells or from plasma. The mediators released from cells include: vasoactive amines (histamine, serotonin), arachidonic acid metabolites (prostaglandins, leukotrienes), platelet-activating factor, various lysosomal enzymes, cytokines (interleukins, lymphokines)⁸ and neuropeptides (substance P, calcitonin gene-related peptide).⁹ Substances released from plasma are: fibrinolytic peptides, anaphylatoxins (C3a, C5a), and kinins.⁸ Release of these substances can either directly lower the response threshold of the sensory nerve fibers or cause pain indirectly by increasing the vascular permeability and producing edema and swelling. Investigations on the concentration of some of these substances in the pulp and periapical tissues show that the levels of these substances are higher in symptomatic as compared to asymptomatic patients.¹⁰⁻¹²

DIAGNOSIS

To arrive at proper initial diagnosis, use an orderly approach.¹

1. Obtain pertinent information regarding the medical and dental

histories.

Perform intraoral and radiographic examinations.

Ask subjective questions related to history, location, severity, duration, character and eliciting stimuli of pain.

Include in the objective tests, examination of face and soft and hard tissues.

Use palpation and percussion sensitivity tests to determine periapical inflammation as the source of pain. Use pulp vitality tests for information on the status (vital or necrotic) of the pulp.

Periodontal examination is always necessary. Probing of the sulci helps to differentiate endodontic from periodontal diseases. Radiographic examination discloses interproximal and recurrent caries, possible pulpal exposure, internal or external resorption as well as periapical pathosis.

PRETREATMENT EMERGENCIES

The pulpal and periapical conditions that require endodontic emergency treatment are irreversible pulpitis, acute apical periodontitis and acute apical abscess. Complete removal of the causes of these conditions is preferred. The amount of time available, however, usually determines the extent of treatment during the emergency visit. A return emergency visit is needed if the operator cannot complete debridement of the root canals.¹³

In patients with signs and symptoms of irreversible pulpitis, complete cleaning and shaping of the root canal(s) system is needed. If time does not permit, perform extirpation of most pulpal tissue in single-rooted teeth, remove pulpal tissue from the largest canals (palatal or distal root) and enlarge the small root canals to at least a

No. 20 or No. 25 size file.

Pulpotomy is usually effective in molars when minimal amounts of time are available. After irrigation of the canals with sodium hypochloride, the canals should be dried and sealed temporarily. A mild analgesic should be prescribed for patients with irreversible pulpitis, but no antibiotics.

In teeth with necrotic pulps and acute apical periodontitis, complete cleaning and shaping of the root canal system is also the treatment of choice. Without adequate time, complete cleaning and shaping of the largest canals (palatal or distal) and partial debridement of the small canals to at least a size No. 20 or No. 25 file usually relieves pain. No antibiotics, but a mild to moderate analgesic, should be prescribed.

With acute apical abscess, the canals should ideally be completely debrided. The apical foramen may be enlarged by a small instrument (not larger than a No. 25 size file) to establish intracanal drainage (this may not occur). In addition, the soft tissue swelling should be incised for drainage. Do not leave these teeth open.

These patients require a moderate to strong analgesic. A common therapeutic approach is to prescribe an antibiotic, but local swellings in the vestibule or palate do not require, nor are there demonstrated advantages to, antibiotics. In contrast, rapidly expanding, diffuse swellings require antibiotics.

Speed of recovery in these patients, whether the swelling is localized or diffuse, depends primarily on the degree of canal(s) debridement and the amount of drainage obtained during the emergency visit. As with patients undergoing removal of impacted

third molars,¹⁴ pretreatment with nonsteroidal anti-inflammatory drugs may reduce the frequency and the amount of postoperative discomfort.

INTERAPPOINTMENT EMERGENCIES (FLARE-UPS)

These are related to: irritants left within the root canal system, iatrogenic factors under the control of the operators and host factors. Factors such as age, gender, tooth type, presence of preoperative pain, presence of allergies and sinus tract stoma significantly influence the frequency of interappointment emergencies.¹⁵

Patients who had vital pulps and completely cleaned root canals should be reassured and be given a mild to moderate analgesic. If the inflamed pulps were not totally eliminated during the first visit, complete cleaning of the canals in the second visit should relieve pain.

Absence of an apical stop and presence of blood in the apical portion of the root canal usually indicate overinstrumentation. Placement of corticosteroids in the root canals of these teeth or its systemic use may reduce the incidence and intensity of pain.¹⁶⁻¹⁸ An interappointment emergency in cases with necrotic pulp and acute apical periodontitis, or an acute apical abscess, may be complicated by inadequate cleaning and shaping in the initial visit. Complete debridement of the canals in these cases usually aids in relief of symptoms.

Resistant bacteria to the prescribed antibiotics might also contribute to these emergencies as well. Prescribing a non-steroidal anti-inflammatory medication in patients with vital pulps may reduce the frequency of

interappointment emergencies. Pretreatment with antibiotics reduces the incidence of flare-ups^{19,20}; however, a recent clinical trial did not show prophylactic penicillin to be effective.²¹

POSTOBTURATION EMERGENCIES

These emergencies occur less frequently than those described. In a clinical study, Harrison and associates²² showed that patients who experienced interappointment complications had a higher incidence of postobturation pain. Approximately half of their patients reported postobturation pain. The highest incidence and the most severe pain occurred during the first postoperative 24 hours. Postobturation pain might be caused by trauma and/or extension of filling materials to the periapical tissues. Informing the patient about possible discomfort for the first few days, assuring the patient regarding availability of emergency services and administration of mild analgesics can significantly reduce the incidence of postobturation emergencies.

Retreatment (in cases with obvious inadequate root canal therapy) or surgical intervention (in cases with overextended and/or uncorrectable filling) is indicated when patients experience persistent pain and/or swelling after completion of root canal therapy. ■



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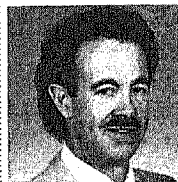
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