

Endodontic Pharmacology at The Endodontic Flare-Ups

Erhan Erkan

Istanbul Medipol University School of Dentistry
Turkey

COLUMN ARTICLE

Origins of the Endodontic Flare-Ups

A flare-up can be explained a hyperalgesia syndrome with acute pain and sometimes swelling. Periradicular damage during the root canal treatment is the main reason of the endodontic flare-ups. Dental pain may be occurred at all level of the root canal therapy and endodontic flare-ups can occur after root canal treatment and it's rate varies from 1,4% and up to 20% according to different researchers. Endodontic flare-ups also occur in older people very rare and it is more common on women than men. In addition flare-ups may occur more in upper lateral incisors, mandibular molar and teeth with large periapical lesion.

Etiology of the endodontic flare-ups is a variety of mechanical, chemical and microbial factors and the immediate inflammatory response of the periradicular tissues begin. Because of the complex anatomy of the root apex microorganisms and its metabolic products can penetrate in the apical area and cause acute inflammatory response quickly. In addition, incomplete removal of the necrotic pulp can start an inflammatory response in the apical region too. In addition host resistance may affect the incidence of flare-ups. Absence of a periapical lesion is a risk factor for formation of endodontic flare-ups.

All canal instrumentation techniques have an ability of creating debris and during the canal preparation various amount of debris can extrude into periodontal area. Debris can contain necrotic pulp remnants, irrigation solutions

and microorganism especially at devital teeth so acute inflammation is certain. Over-instrumentation and extrusion of the gutta-percha and root canal sealers is the other member of the mechanical factors. Irrigation solutions, root canal sealers and intracanal medicaments have different level of toxicity on periradicular tissues. Because of this clinicians must avoid from any extrusion of root canal filling. On the other hand, formaldehyde based root canal sealers and pastes are highly toxic on vital tissues. When this type of sealers contact on periradicular tissues a necrosis has occurred suddenly and inflammation response is concluded acute pain or swelling. Clinicians must avoid from using that type of sealers too.

Development of the Inflammatory Response

Pulpal and periapical inflammatory response can be explained in two ways;

The hydrodynamic theory and Inflammation with stimulation of the nerve fibres.

According to hydrodynamic theory, as a result of stimulation, a fluid movement occurs in exposed dentin (Figure 1). So, this kinematic stimulation affects the nociceptive nerve fibres. On the other hand, acute pain occurs as a result of the inflammatory mediators such as prostaglandins, substance P bradykinin and histamine (Figure 2).

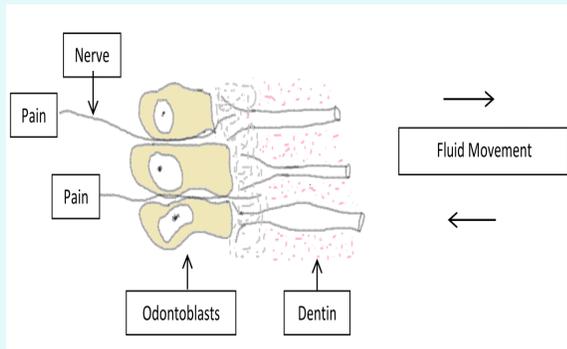


Figure 1: The Hydrodynamic Theory.

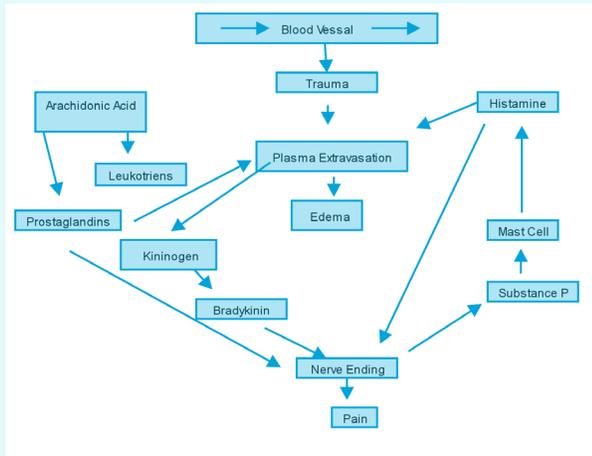


Figure 2: Inflammatory Response with Acute Pain.

How Flare-Ups are controlled in Endodontic Root Canal Treatment

First of all right diagnosis and root canal treatment can help to clinician to reduce the rate of the flare-ups. Intracanal drainage must be tried at once. Alveolar bone trephination is also a good alternative at some cases. If there is severe swelling at the oral mucosa incision for the drainage is good option. Occlusal reduction stop the sensitivity of biting so mechanical situation can be controlled at this time. On the other hand, pre-medication and post-operative drugs such as analgesics may reduce the level of pain and edema.

Premedication

Pre-operative antibiotic usage may be an effective method to reduce flare-up and its symptoms especially at necrotic teeth and periapical lesions. But recent studies show that using non-steroidal analgesic drugs are more effective than antibiotics and few studies say that using antibiotics has no effect. The studies also show that there is no significant benefit at necrotic teeth and chronic apical lesions. In addition, bacterial resistance is still a potential danger for the future. At this time penicillin is the first option to use but different types of antibiotics such as erythromycin, cephalosporin and clindamycin may be used at penicillin allergy.

NSAID is still the best way to reduce acute pain. If NSAID is contraindicate parasetamol can use safely. Many studies show that using NSAID before 30 minutes from root canal treatment is very effective to reduce pain and swelling.

Long – acting local anesthetics are significantly effective than lidocaine to prevent post-operative pain. In addition, block injections are more effective than infiltrative injections too.

Post-Operative Medical Applications

Flare-up cases have needed to solve quickly. Because of the severe periradicular inflammation and swelling pain level of the patient is very high.

Using non-steroidal anti-inflammatory drugs (NSAID) must be the first option at the endodontic flare-ups and pain (e.g., 400 mg ibuprofen or 100 mg flurbiprofen). If NSAID cannot be used, parasetamol (1000 mg) and opioid combination is an excellent alternative medication for acute pain syndrome too (Table 1).

Opioid analgesic agents are often used in combination with NSAID (aspirin, ibuprofen and parasetamol) for best analgesic strength in dental emergencies. This combination is preferred because of the lower dose of this agent to reduce side effects (nausea, emesis, dizziness, drowsiness).

Glucocorticosteroids have an ability to reduce the acute inflammatory response by suppressing inflammatory mediators and plasma extravasation. Because of these corti-

steroids can use for prevent or reduce post-operative endodontic pain and flare-ups. Many studies show that corticosteroid agents significantly reduce post-op pain compared with placebo especially intracanal administration. However, many clinicians choose NSAID agents much more because of the strong effect and safety.

treatment and its requirements are necessary to avoid this situation. However right pharmacological preferences are very helpful to solve this problem.

| Analgesic Agents | Dosage(mg) | Max Daily Dose(mg) |
|--------------------------------|-------------------|---------------------------|
| Parasetamol | 325-1000 | 4000 |
| Aspirin (acetylsalicylic acid) | 325-1000 | 4000 |
| Diclofenac Potassium | 50-100 | 200 |
| Etodalac | 200-400 | 1200 |
| Meloxicam | 200-400 | 1200 |
| Nimesulide | 200-400 | 1200 |
| Fenoprofen | 200 | 1200 |
| Flurbiprofen | 50-100 | 300 |
| Ibuprofen | 200-400 | 2400 |
| Ketorolac | 10 | 40 |
| Naproxen sodium | 275-550 | 1650 |
| Naproxen | 250-500 | 1500 |
| Ketoprofen | 20-75 | 300 |
| Tenoxicam | 20 | 20 |
| Lornoxicam | 20 | 20 |
| Piroxicam | 20 | 20 |

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Table 1: NSAIDs and Parasetamol and Dose of These Agents at Endodontic Flare-Ups & Pain.

Antibiotics are necessary in the presence of systemic symptoms of infection and acute swelling. Using antibiotics with NSAID is an effective way to treat endodontic flare-up with infection. *F.nucleatum*, *Prevotella* and *Porphyromonas* species are isolated from flare-up cases in many studies so penicillin group antibiotics are the first option at the treatment.

CONCLUSION

Endodontic flare-up cases are undesirable situations for patients and dentists. First of all a well planning root canal