Management of Endodontic Emergencies

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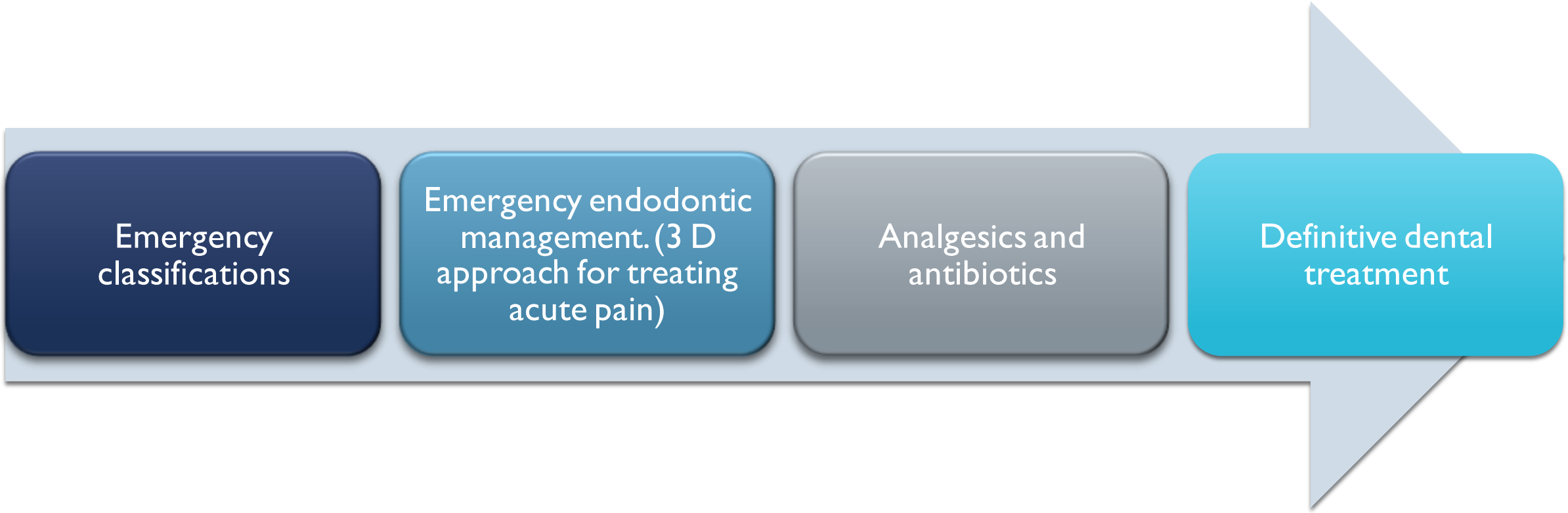
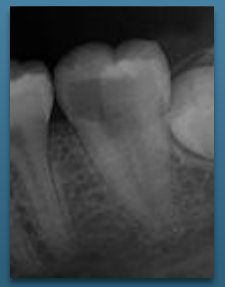
Lecture Outline



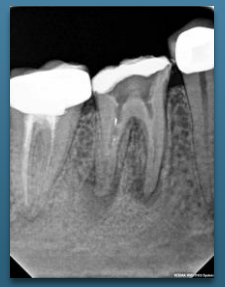
Endodontic Emergency

- Pain and/or swelling, caused by various stages of inflammation or infection of the pulpal and/or periapical tissues.
- Emergency vs. Urgency.

Emergency Classifications



1. Pretreatment Emergency

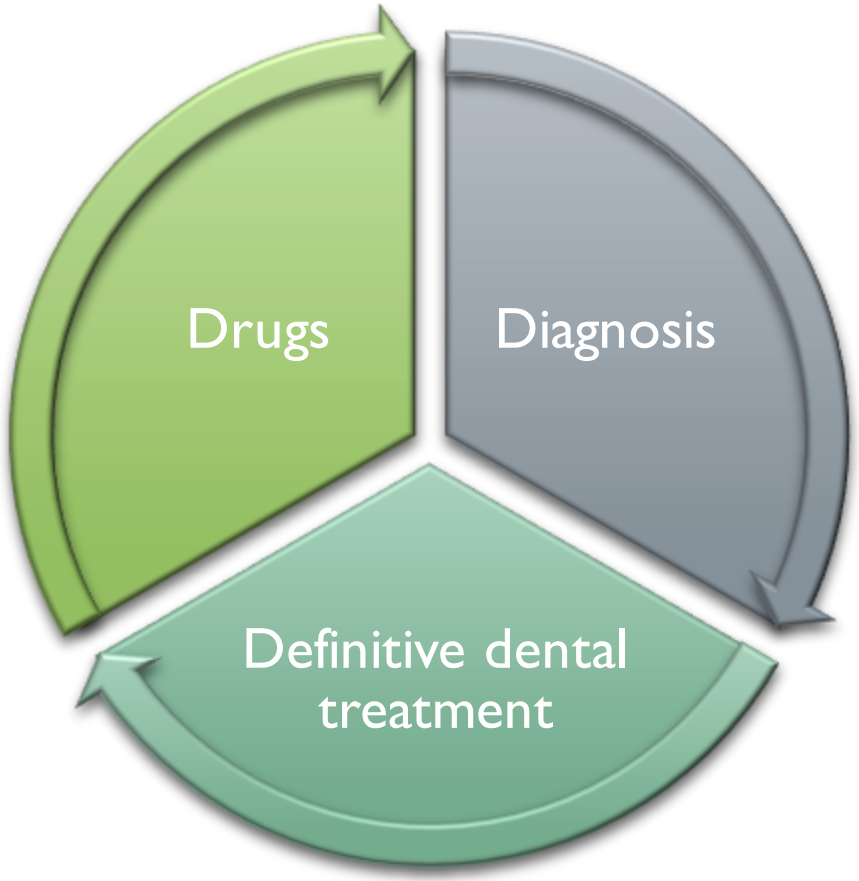


2. Inter-appointment Emergency

3. Post-obturation Emergency

Flare-ups

Emergency Endodontic Management



Emergency Endodontic Management

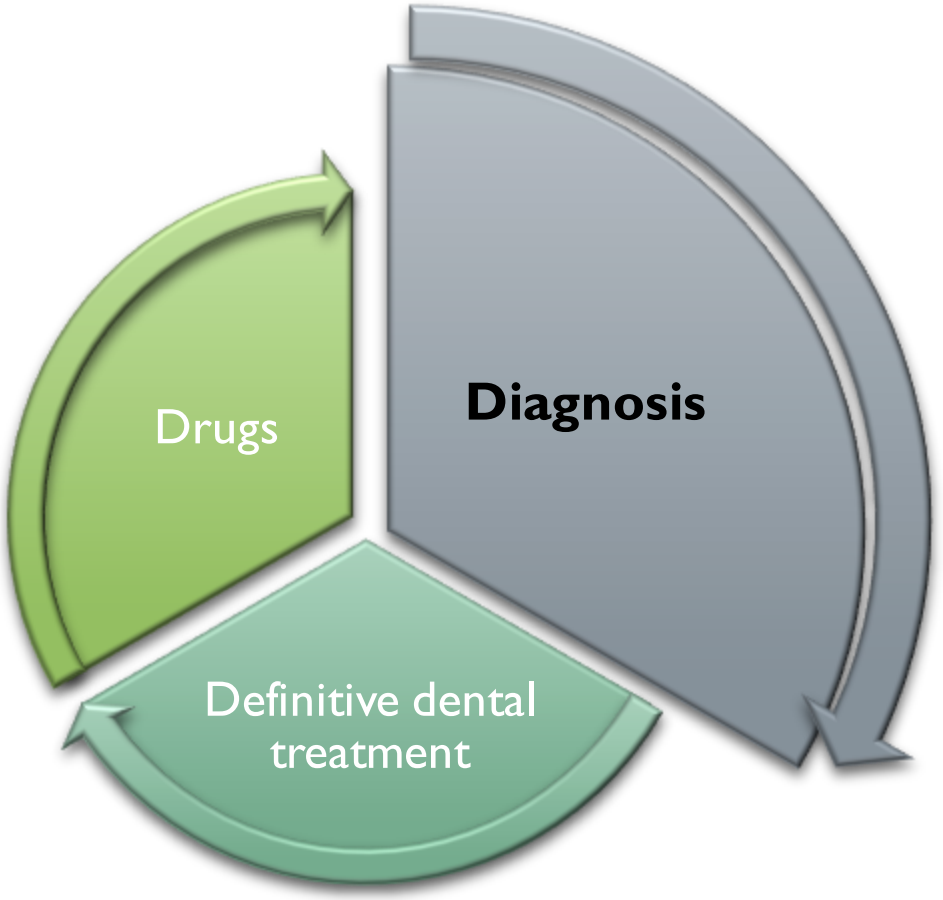
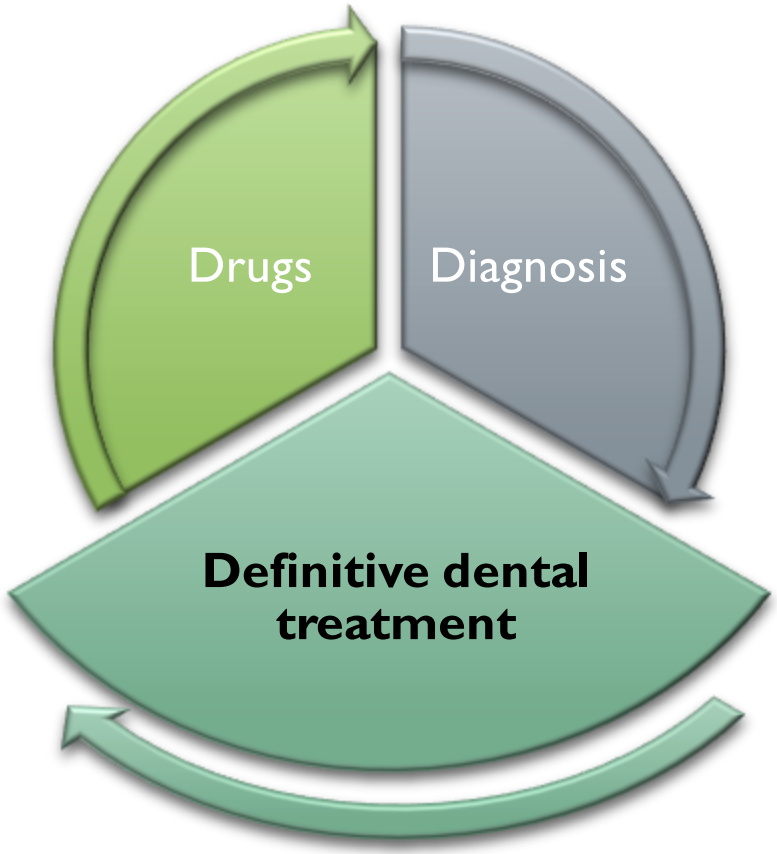


Table 1. Differential Diagnosis of Dental Pain

Odontalgia – *e.g.*, reversible pulpitis, symptomatic irreversible pulpitis, symptomatic apical
Musculoskeletal – *e.g.*, TMD
Neuropathic – *e.g.*, trigeminal neuralgia, herpes infection
Neurovascular – *e.g.*, migraine, cluster headache
Inflammatory Conditions – *e.g.*, sinusitis
Systemic Disorders – *e.g.*, cardiac pain
Psychogenic – *e.g.*, persistent somatoform pain disorder

Emergency Endodontic Management



1. Non surgical root canal tratment
2. Occlusal reduction
3. Pulpatomy
4. Incision and drainage

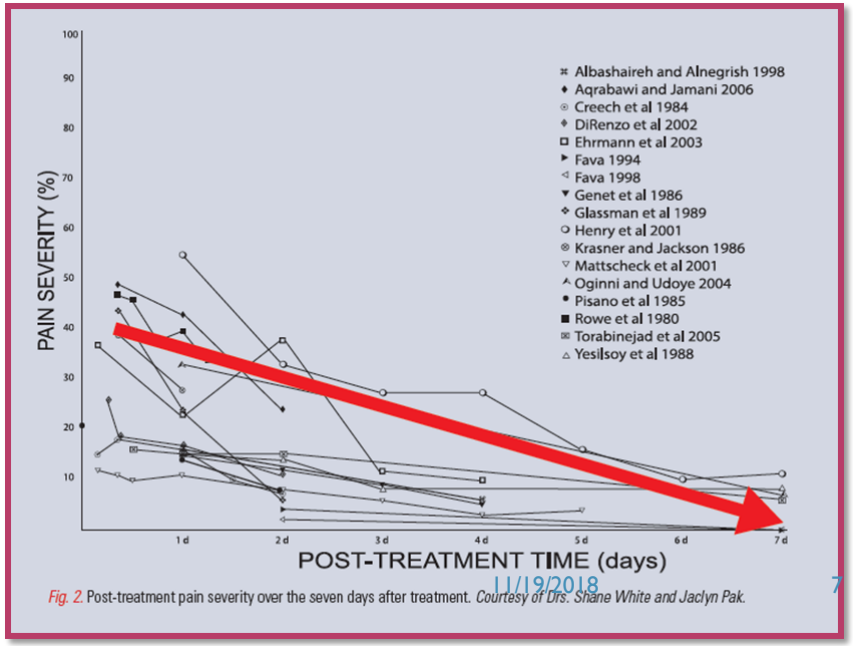
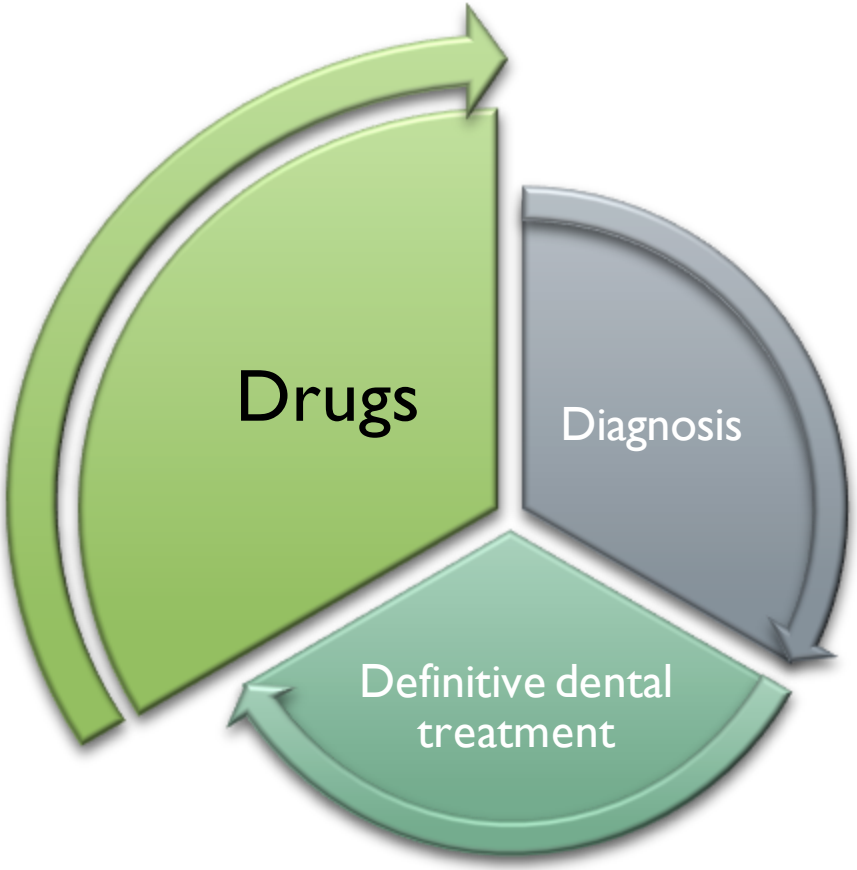


Fig. 2. Post-treatment pain severity over the seven days after treatment. *Courtesy of Drs. Shane White and Jaclyn Pak.*

Emergency Endodontic Management



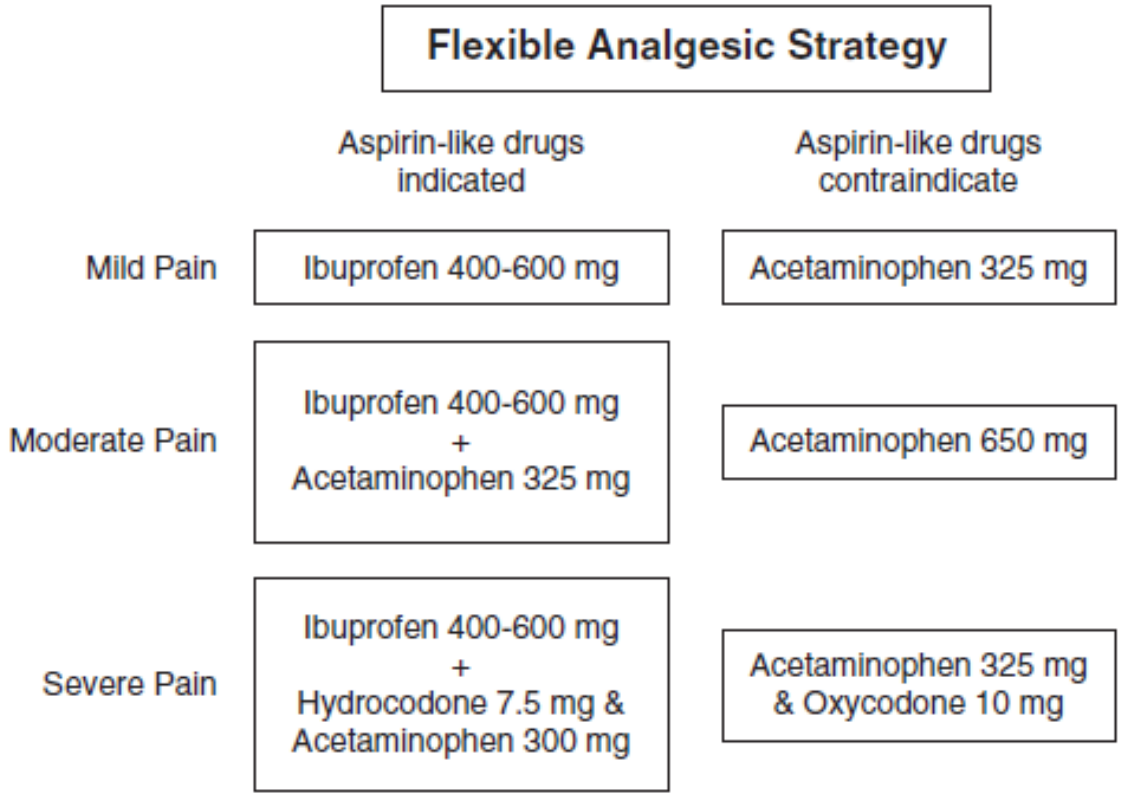
1. Local Anesthesia
2. Analgesics
3. Antibiotics

Analgesics

Table 2. Commonly Prescribed Analgesics for Treating Dental Pain

Drug	Brand Name	Dosage	Maximum Dosage
Ibuprofen	Advil, Motrin, Nuprin	400-600 mg every 4-6 hours	3200 mg/day
Naproxen	Aleve, Naprosyn	440-500 mg every 12 hours	1000-1100 mg/day
Acetaminophen with Codeine #3	Tylenol with Codeine #3 (30 mg codeine/ 300 mg acetaminophen)	1-2 tablets every 4-6 hours	3000 mg acetaminophen/day and 360 mg codeine/day
Acetaminophen with Hydrocodone	Vicodin-5 (5 mg hydrocodone/ 300 mg acetaminophen)	1-2 tablets every 4-6 hours	3000 mg acetaminophen/day and 60 mg hydrocodone/day
Acetaminophen with Oxycodone	Percocet-5 (5 mg oxycodone/325 mg acetaminophen)	1-2 tablets every 4-6 hours	3000 mg acetaminophen/day and 60 mg oxycodone/day
Tramadol	Ultram (50 mg tramadol)	1-2 tablets every 4-6 hours	400 mg/day
Acetaminophen with Tramadol	Ultracet (37.5 mg tramadol/ 325 mg acetaminophen)	1-2 tablets every 4-6 hours	3000 mg acetaminophen/day and 400 mg tramadol/day

Analgesics


Flexible Analgesic Strategy
Aspirin-like drugs indicated
Aspirin-like drugs contraindicate
Mild Pain
Ibuprofen 400-600 mg
Acetaminophen 325 mg
Moderate Pain
Ibuprofen 400-600 mg + Acetaminophen 325 mg
Acetaminophen 650 mg
Severe Pain
Ibuprofen 400-600 mg + Hydrocodone 7.5 mg & Acetaminophen 300 mg
Acetaminophen 325 mg & Oxycodone 10 mg

Analgesics

- ✓ A combination of ibuprofen 600 mg and acetaminophen 1000 mg is more effective than placebo but not significantly different than ibuprofen 600 mg at 6 hours postoperatively. Ibuprofen 600 mg is more effective than placebo at 6 hours postoperatively
- ✓ However, there are insufficient data to recommend the most effective NSAID, dose amount, or dose interval for the relief of postoperative endodontic pain of longer duration in patients with preoperative pain.

Smith EA, Marshall JG, Selph SS, Barker DR, Sedgley CM. **Nonsteroidal Anti-inflammatory Drugs for Managing Postoperative Endodontic Pain in Patients Who Present with Preoperative Pain: A Systematic Review and Meta-analysis.** *J Endod. 2017 Jan;43(1):7-15.*

Antibiotics

Indications for Adjunctive Antibiotics

1. Fever > 100° F
2. Malaise
3. Lymphadenopathy
4. Trismus
5. Increased Swelling
6. Cellulitis
7. Osteomyelitis
8. Persistent Infection

Antibiotics

Conditions Not Requiring Adjunctive Antibiotics

1. Pain without signs and symptoms of infection
a. Symptomatic irreversible pulpitis
b. Acute periradicular periodontitis

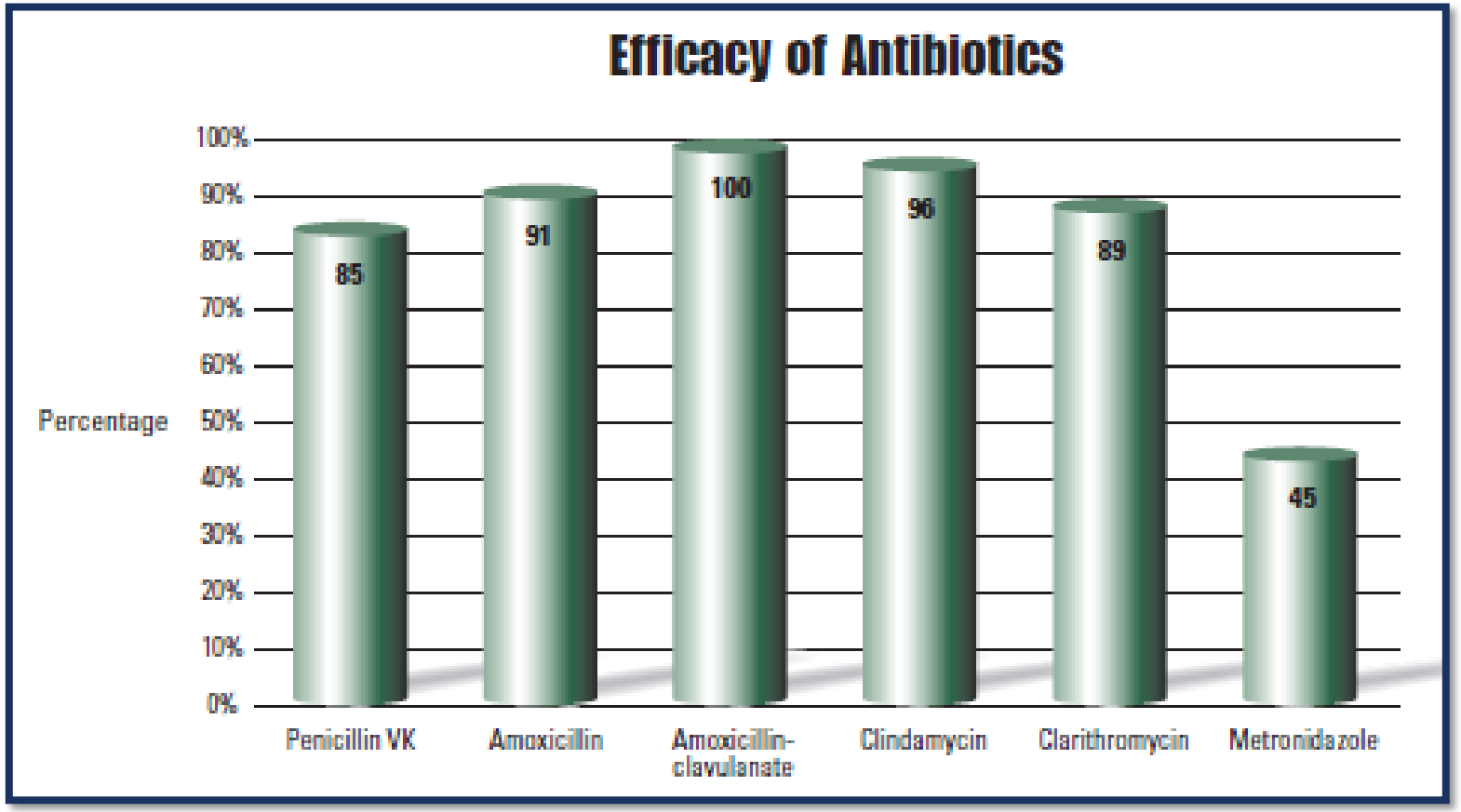
2. Teeth with necrotic pulps and a radiolucency

3. Teeth with a sinus tract (chronic periradicular abscess)

4. Localized fluctuant swellings

Antibiotics

Types of Antibiotics and Recommended Dosages



Types of Antibiotics and Recommended Dosages

Table 4 Effective antibiotics prescribed in endodontics (references in the text)

Drug of choice	Loading dose	Maintenance dose
Penicillin VK[a]	1000 mg	500 mg q4–6 h
Amoxicillin with or w/o clavulanic acid	1000 mg	500 mg q8 h or 875 mg q12 h
Clindamycin[b]	600 mg	300 mg q6 h
Clarithromycin[b]	500 mg	250 mg q12 h
Azithromycin[b]	500 mg	250 mg q24 h
Metronidazole	1000 mg	500 mg q6 h

[a]If Penicillin VK alone is not effective in 48–72 h, metronidazole (loading dose 1000 mg followed by 500 mg q6 h) can be used in combination with penicillin VK or penicillin VK is switched to amoxicillin/clavulanic acid or clindamycin.
[b]If the patient is allergic to penicillin.

Segura-Egea et al. Antibiotics in Endodontics: a review. Int Endod J. 2017;50:1169–1184.

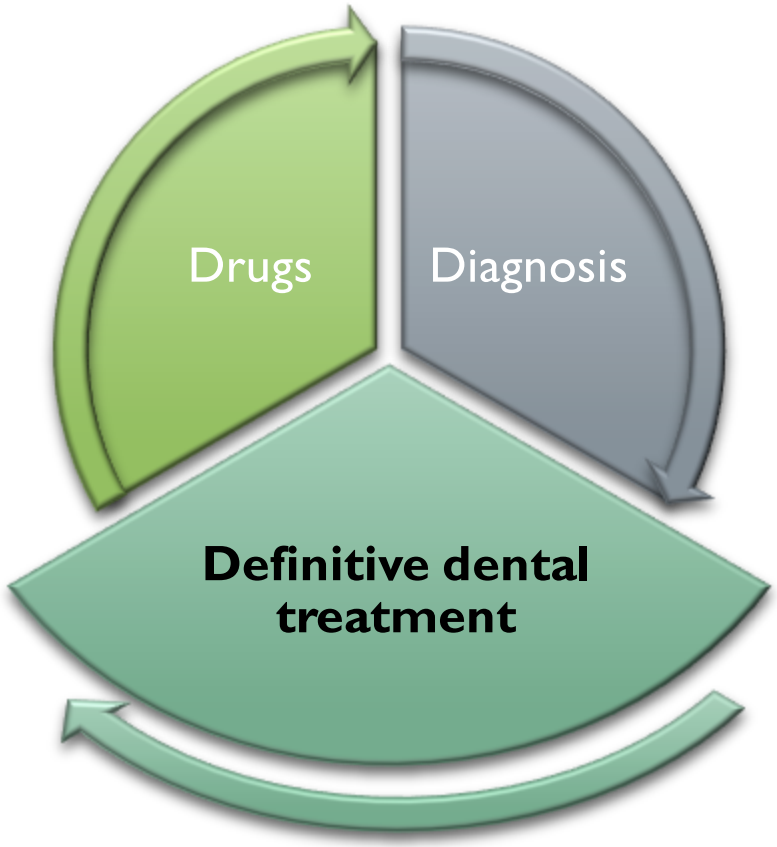
Types of Antibiotics and Recommended Dosages

Table 5 Antibiotic prophylaxis for medically compromised patients (references in the text)

Patient group	Antibiotic	Route	Dose		Timing before procedure
			Adults	Children	
Standard general prophylaxis	Amoxicillin	PO	2 g	50 mg kg^{-1}	1 h
Unable to take oral medication	Ampicillin	IV o IM	2 g	50 mg kg^{-1}	Within 30 min
Allergic to penicillin	Clindamycin	PO	600 mg	20 mg kg^{-1}	1 h
	Cephalexin or cefadroxil	PO	2 g	50 mg kg^{-1}	1 h
	Azithromycin or clarithromycin	PO	500 mg	15 mg kg^{-1}	1 h
Allergic to penicillin / amoxicillin / ampicillin and unable to take oral medications	Clindamycin	IV	600 mg	20 mg kg^{-1}	Within 30 min
	Cefazolin	IV	1 g	25 mg kg^{-1}	Within 30 min

Segura-Egea et al. Antibiotics in Endodontics: a review. Int Endod J. 2017;50:1169–1184.

I. Pretreatment Emergencies

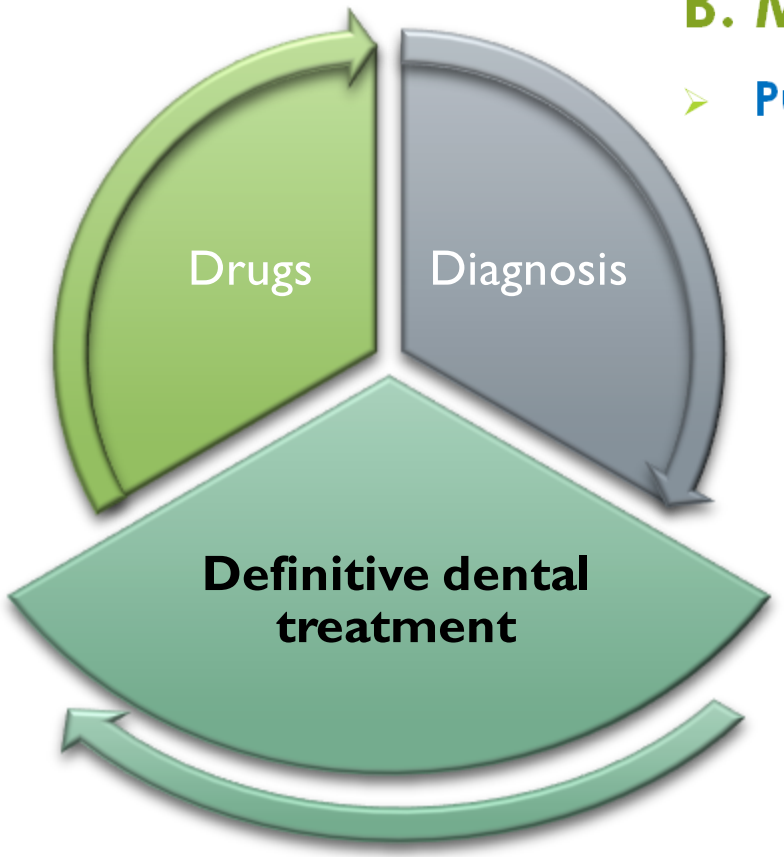


A. Management of Painful Irreversible Pulpitis

- Without Symptomatic Apical Periodontitis

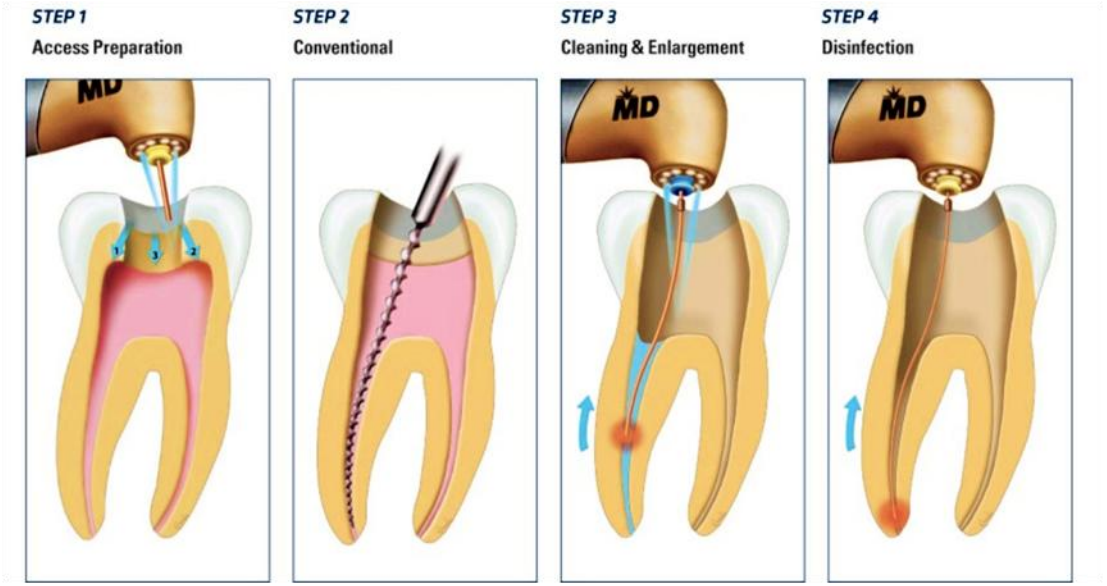
- With Symptomatic Apical Periodontitis

I. Pretreatment Emergencies

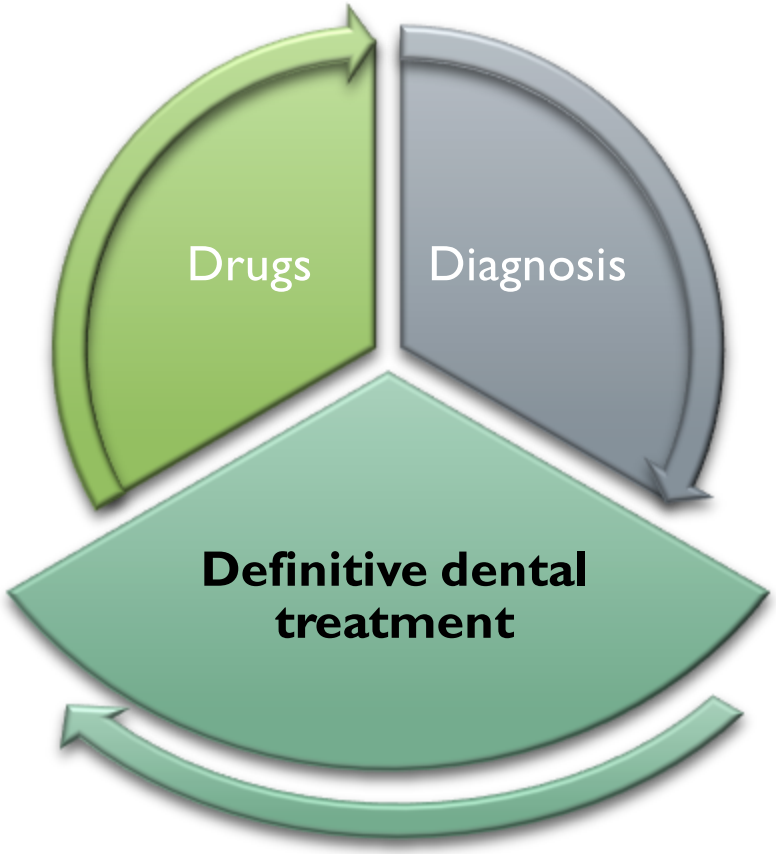


B. Management of Pulp Necrosis with Apical Pathosis

- Pulp Necrosis without Swelling



I. Pretreatment Emergencies

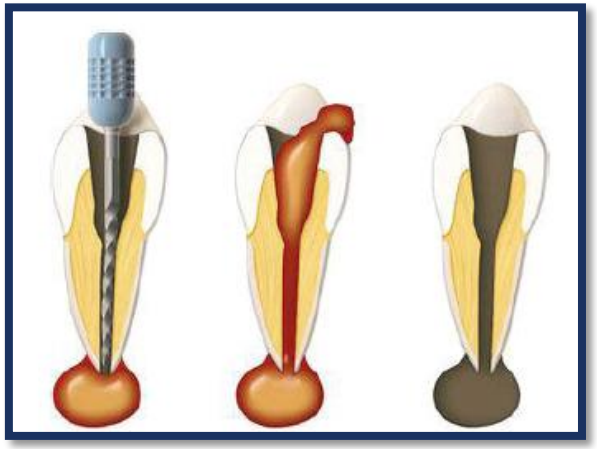


B. Management of Pulp Necrosis with Apical Pathosis

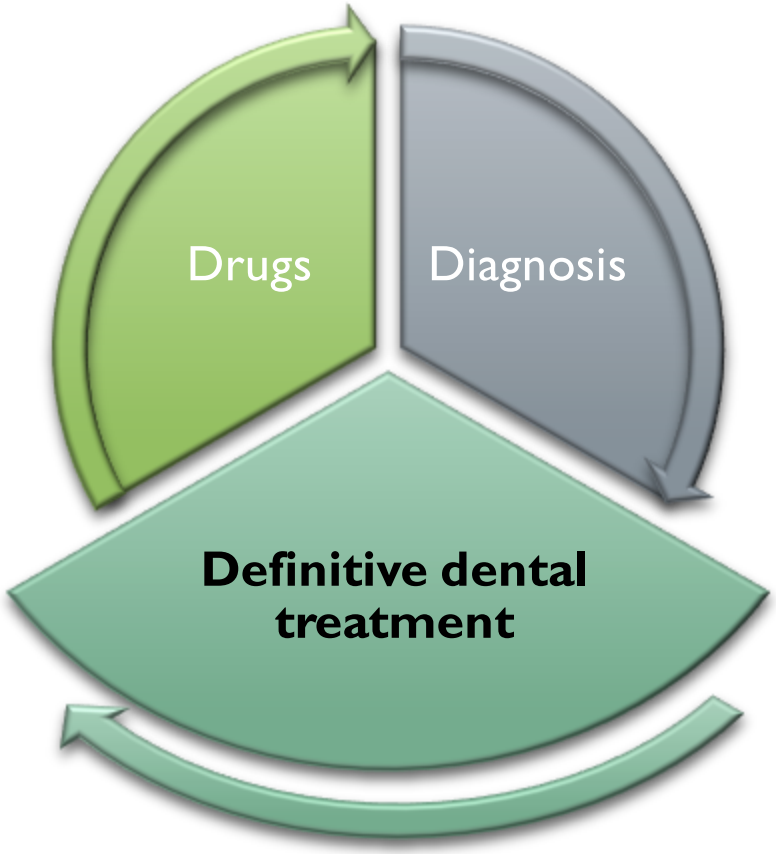
- **Pulp Necrosis with Localized Swelling**

(1) relief of pressure and pain

(2) removal of a very potent irritant.



I. Pretreatment Emergencies



B. Management of Pulp Necrosis with Apical Pathosis

- **Pulp Necrosis with Diffuse Swelling "Cellulitis"**

2. Interappointment Emergency

- **Flare-ups:** Sever pain and /or swelling after initiation or continuation of endodontic treatment.
- **Overall incidence:** 1.5% to 20%.
- **Causative Factors:**

Patient Factors

- ☐ Genetic
- ☐ Gender
- ☐ Anxiety
- ☐ Preoperative diagnosis

Treatment Factors

- ☐ Incomplete pulpectomy
- ☐ Mechanical irritation
- ☐ Chemical irritation
- ☐ Number of treatment visits

2. Interappointment Emergency

- **Causative Factors:**

Patient Factors	Treatment Factors
☐ Genetic	☐ Incomplete pulpectomy
☑ Gender and Age	☐ Mechanical irritation
Women, 40-60 age group	
☐ Anxiety	☐ Chemical irritation
☑ Preoperative diagnosis	☐ Number of treatment visits

Asymptomatic irreversible pulpitis (10%) followed by necrosed pulp with periapical lesion (2.7) and without periapical lesion (2.1%)

Nair M1, Rahul J, Devadathan A, Mathew J. **Incidence of Endodontic Flare-ups and Its Related Factors: A Retrospective Study.** J Int Soc Prev Community Dent. 2017 Jul-Aug;7(4):175-179.

2. Interappointment Emergency

- **Causative Factors:**

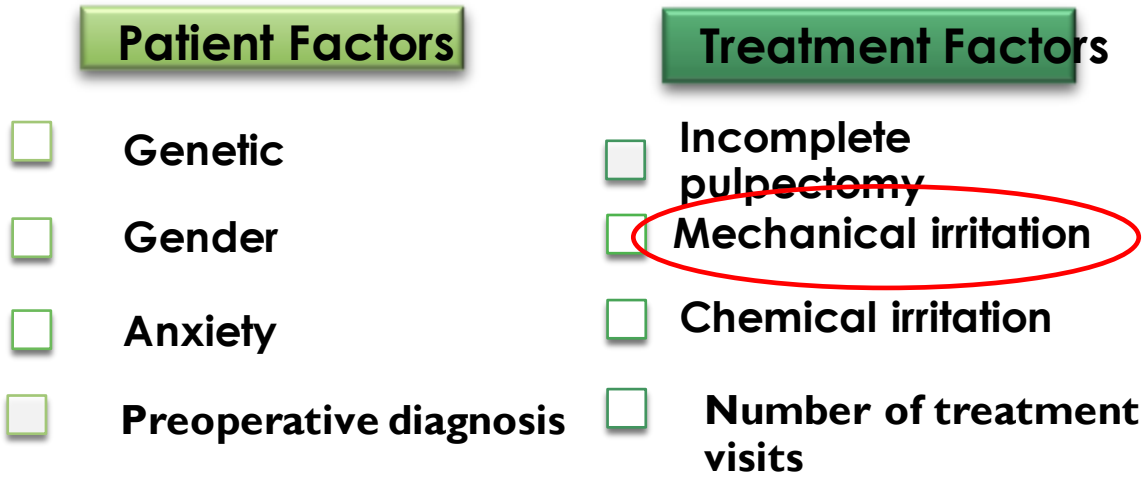
Patient Factors	Treatment Factors
☐ Genetic	☐ Incomplete pulpectomy
☑ Gender and Age	☐ Mechanical irritation
>50 years	
☐ Anxiety	☐ Chemical irritation
☑ Preoperative diagnosis	☐ Number of treatment visits

There was a statistically significant difference between the vital group compared to the non-vital and retreatment groups ($P < 0.001$). Teeth in the vital group exhibited no flare-up (0 %) compared to 15 flare-ups in the non-vital group (5.3 %) and 8 in the retreatment group (4.4 %)

Azim AA, Azim KA, Abbott PV. **Prevalence of inter-appointment endodontic flare-ups and host-related factors.** Clin Oral Investig. 2017 Apr;21(3):889-894.

2. Interappointment Emergency

- **Causative Factors:**

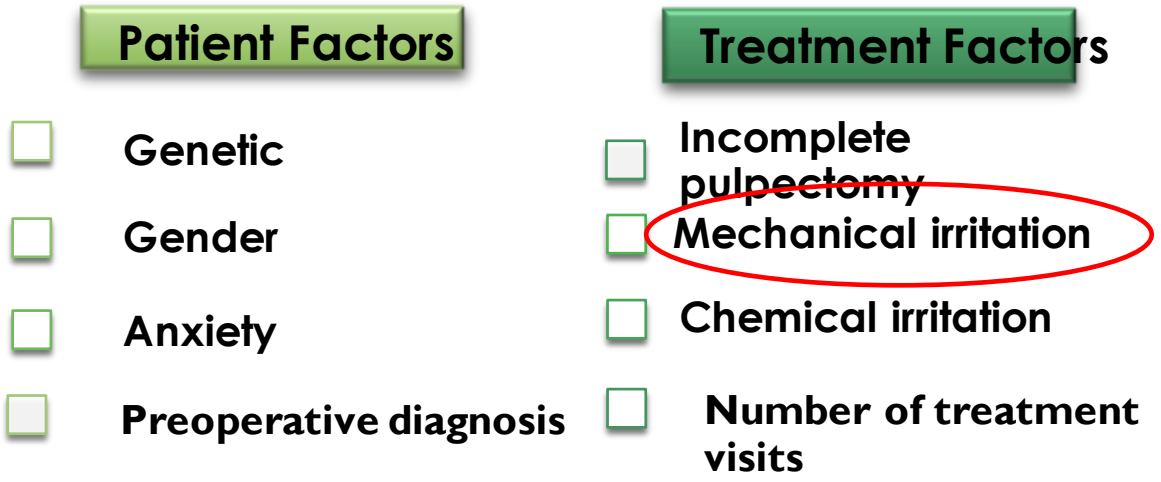


✓ Maintenance of apical patency during chemomechanical preparation had no significant influence on post-operative pain in posterior teeth with necrotic pulps and apical periodontitis.

Arora M, Sangwan P, Tewari S, Duhan J. ***Effect of maintaining apical patency on endodontic pain in posterior teeth with pulp necrosis and apical periodontitis: a randomized controlled trial****. Int Endod J. 2016 Apr;49(4):317-24.*

2. Interappointment Emergency

- **Causative Factors:**



✓ Postoperative pain was higher in the Foraminal Enlargement group compared with conventional endodontic therapy in the first days after treatment in teeth with necrosis and apical periodontitis.

Borges Silva EA1, Guimarães LS1, Küchler EC2, Antunes LAA3, Antunes LS4. Evaluation of Effect of Foraminal Enlargement of Necrotic Teeth on Postoperative Symptoms: A Systematic Review and Meta-analysis. J Endod. 2017 Dec;43(12):1969-1977.

Necrosis and Single-visit Endodontics

- ✓ A retrospective study compared one-visit versus two-visit endodontic treatment in pulpally necrotic molars. Treatment records of 402 consecutive patients with pulpally necrotic first and second molars were compared. Sixteen flare-ups (8%) occurred in the two-visit group versus six flare-ups (3%) for the one-visit group. This showed an advantage for one-visit treatment at a 95% confidence level.

Eleazer and Eleazer, J Endod 1998

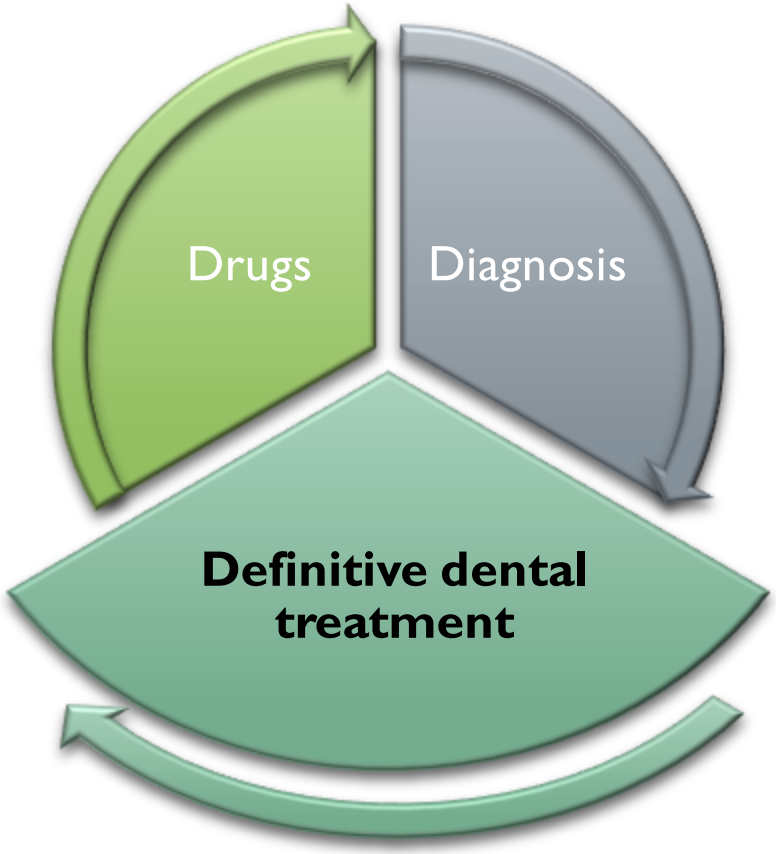
- ✓ A randomized controlled trial study compared the outcome of single- versus 2- visit root canal treatment of teeth with apical periodontitis. The result showed that there was no statistically significant difference between the 2 treatment modalities.

Paredes-Vieyra and Enriquez, J Endod 2012

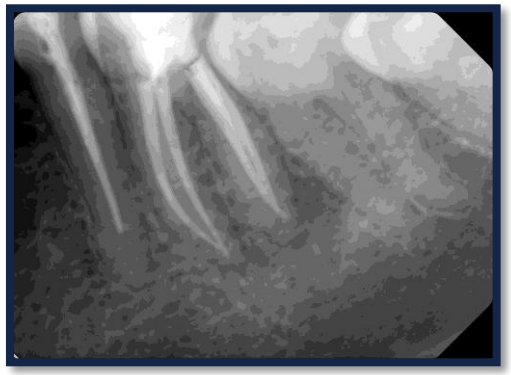
2. Interappointment Emergency Treatment

- ✓ Psychological management
- ✓ Adjusting the working length
- ✓ Relieving the occlusion and systemic administration of nonsteroidal analgesics
- ✓ Passing a small file through the apical foramen in order to get drainage
- ✓ Incision and drainage procedure
- ✓ Antibiotic

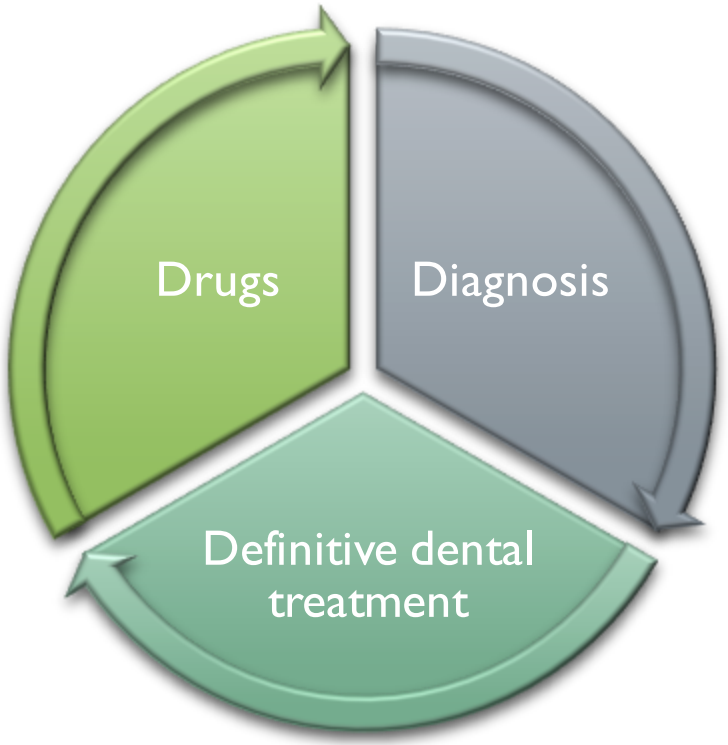
3. Postobturation Emergency



- Causative Factors
- Treatment



EMERGENCY ENDODONTIC MANAGEMENT



THANK YOU

This is a reading guide for the assigned reference

Endodontics: Principles & Practice 5th ed. Chapter 10