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Endodontic postoperative flare up: A review

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Abstract

Have you ever experienced a situation where the patient came back to you in an unscheduled appointment complaining of pain or swelling in the region where you have done root canal treatment, sometimes a few hours or in some cases after some days of Root Canal Treatment and this situation resulted in an emergency treatment.

As a Dental Surgeon we all must have gone through this phase at least once in our daily clinic hours. And this situation has made a true nightmare or agony for every dentist in day-to-day life.

This article will be discussing about the etiology, the other factors affecting this condition, the remedy for the same, how to deal with these kinds of patients and do perfect time management during the busy schedule.

Root Canal treatment is a chemo-mechanical method of disinfection of root canal followed by three dimensional hermetic obturation.

The root canal treatment is done to eradicate the pulpal and peri radicular diseases causative agents and to enhance peri radicular tissue recovery.

As an Endodontist our main intension is to preserve a tooth. Once the tooth is infected with the dental caries initially will go with normal restorative procedure and if we are not able to find a solution with normal restoration the next step is Root Canal Procedures.

Now a days all the Dental Surgeons and especially the Endodontist are using modern root canal procedures and new rotary system, still the post operative endodontic flare up is a major problem faced by dental surgeons.

Keywords: Endodontic, root canal, endodontist, dental surgeons

Introduction

Endodontic postoperative flare up

Endodontic Postoperative flare up is a postoperative pain that starts shortly after root canal treatment and is manifested as pain or swelling episodes, requiring urgent treatment with an unscheduled appointment.

Various ways in which the microorganisms interfere in the root canal treatments

If the root canal procedure is not done well, the microorganisms present will interfere such as in cases where the incomplete instrumentation causing endodontic microbiota, secondary intra radicular infection.

The main cause of the pain or the unscheduled appointment is due to development of the acute inflammation at the peri radicular tissues. The over instrumentation of the root canal and the extrusion of the material through the apex are the mechanical irritation caused by them.

During the procedure of root canal treatment if the working length is not done correctly will also cause endodontic postoperative flare up.

As mentioned above the patient comes with severe pain and swelling, the intensity of the pain is well measured. The Visual Analog Scale is used to measure the intensity of the pain. In this scale there is a line measured from 1 to 100 which represent the intensity of pain.

Along with this scale another scale called as Facial Gremase Scale is used. This scale helps to represent different moods and this scale has five facial gremases.

The combination of Facial Gremase Scale and Visual Analog Scale gives the best result.

The pain of the patient who comes with post operative endodontic flare up ranges between 5 to 44 points which last less than 72 hours. Some studies shows that the endodontic flare up ranges between 4%, 16% to 50%.

The data given above may varies from publications to publication because these depends on the prospective study and retrospective study, the methodology used, the time used, the clinical experience of the dentist, the time where the root canal treatment has done.

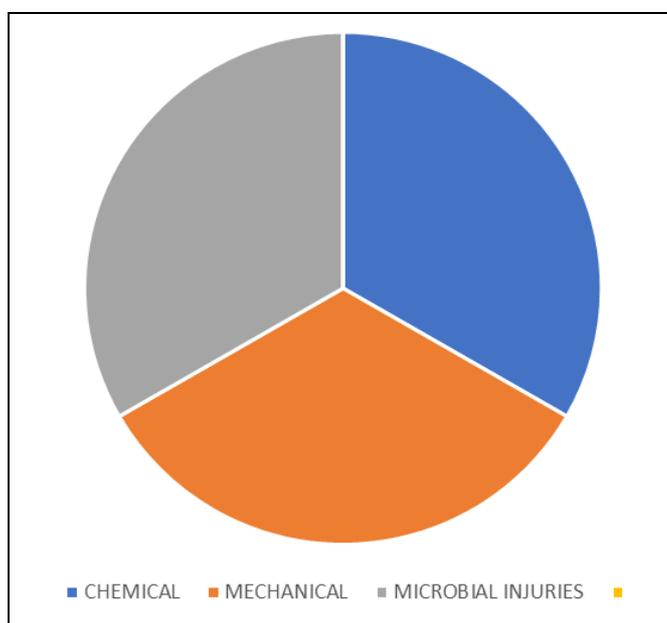
And also, we don't have a gold standard comparison and variable definitions.

Now we need a solution to prevent this post operative endodontic flare, before going to that we should know in detail about what are the causes of the same.

Causative factors

The causative factors include:

- Mechanical
- Chemical
- Microbial injuries



Of the above-mentioned factors, the microorganism is arguably the major factor contributing to this. As we know the host is enable to eliminate the root canal infection concentration of the defense component at the peri radicular tissue which causes the spread of the infection.

1. Microbial factors

The complexity of the root canal is a challenging for the endodontist to perform root canal treatment. As we know root canal treatment means the cleaning of the canals in the tooth, the main intension of the treatment is to eliminate the disease-causing microorganism in the tooth.

Our root canal contains many microorganisms presiding in it. These microorganisms will cause asymptomatic apical periodontitis in it. Along with the virulent factors they will enter the peri radicular tissues. These microorganisms will proliferate in the apical area of the tooth and proliferate. The microbial density in the apex increases having majority of anaerobic microorganisms.

Local adaptation syndrome

There exists a local adaption between the microflora and the human immune system called as Local adaptation syndrome.

This chemistry that occurs in the asymptomatic apical periodontitis will be disturbed during the endodontic treatment after removal of the debris in the peri radicular tissue which result the formation of flare up.

Or in other words, when we are doing the root canal treatment if the peri radicular tissues are damaged during manipulation of the root canal, an acute inflammatory response develops called as flare up.

Even though the flare up activates the defense mechanism in our body and starts fighting against the infections, the flare up cause discomfort to the patient like pain and swelling.

The organisms associated with this include *Porphyromonas endodontalis*, *Porphyromonas gingivalis*, *Prevotella* and *F nucleatum*. Mainly seen bacteria is the black pigmented bacteria.

The intensity of the flare up depends on the quantity and the virulence of the micro-organism in the periodontal tissues.

Flare up in cases of symptomatic apical periodontitis can be due to, non-hermetic temporary filling between appointment or after treatment if left for more than two weeks, when the chemo mechanical preparation is inadequate, uncleaned carious tissues and insufficient asepsis during the procedure.

If the proper aseptic rules are not followed during the root canal procedures, such as working without rubber dam, insufficient patient mouth hygiene, uncleaned carious tooth, old hermetic fillings, secondary infection in the root canal also causes pain and flare up.

After the endodontic treatment before placing the permanent restoration, we keep temporary restoration and sent the patient and recall after few days. During this time infection might enter through the temporary restoration. And through non hermetic and cracked coronal permanent filling after many months.

The anatomy of the root canal is complicated as it contains accessory canals also and the apical area of the root canal contains many bacteria, the apical root canal is said to be dangerous for host, pathogenic bacteria and the dentist.

The mechanical factors

The second cause of post operative endodontics flare up is the mechanical factors.

In case of asymptomatic apical periodontitis, the root canal of the system will be infected and the microorganisms are able to reach the apical third of the root canal, apical foramen and apical deltas.

The root canal treatment is a chemo mechanical preparation which is the cause for successfull endodontics, during this procedure some amount of debris, necrotic tissues, microorganisms, irrigative solutions, from the root canal access can be pushed into the apical periodontal tissues which results in inflammation and post operative pain and disturbs the healing of periodontal tissues.

It says that only minimum amount of extrusion of debris through the apical foramen should be reached.

So according to various studies the minimal amount of extrusion of the debris through apical foramen is reached using the crown down technique with engine driven NiTi system.

a. Crown down technique

Crown down technique is a procedure in which we will widen the root canal orifices with the Gate Glidden drills and removal of the organic contents of the canal starting from the canal orifices to the apex using the manual files.

In other study performed by Reddy and Hecks shows that

cleaning of the canal using hand endodontic instruments in step back technique average extrusion of the debris into the peri radicular tissue is 2.58mg. and in case of NiTi rotary mechanical instruments with crown down technique it is less than 0.5mg.

While performing the root canal procedure which is a chemo mechanical process, we reach the end of the root canal or the apex which is the physiological apex. During this procedure the over instrumentation of the canal cause irritation to the peri radicular tissue and extrusion of the material through the apical foramen.

b. Working length

The working length is the distance between the highest point in the coronal part of the tooth and the conjunction of cementum and dentin called as the physiological apex of the root. This is the place where the canal preparation and the obturation terminate.

During the time of root canal treatment if the working length is not measured properly this also leads to post operative endodontic flare up.

As I mentioned earlier the conjunction of the cementum and dentin at the area of apex, is at a distance of 0.5 to 3mm in the visible anatomical apex and at a distance of 1 to 2 mm in the radiographic apex.

When the tip of the endodontic working part of the instrument is withdrawn 1mm from the radiographic apex of the root the physiological apex of the root is correctly localized only 16 percentage (According to Brunton *et al*).

In other cases when the tip of the endodontic working part is 0.5mm from the radiographic apex of the root, the working length becomes too short.

And this does not get conjunctioned at the cementum and dentin (According to Hassanien *et al*).

In other study conducted by Welk *et al* the working length was too long and will reach below the physiological apex of the root. When the tip of the instrument reach below the physiological apex, all the debris, filling materials will be extruded from the periodontal tissues. Also the apex of the root will be destroyed, the periodontal tissues get mechanically stimulated, the blood and the exudates will enter the canal and the bacteria will get multiplied rapidly.

In our daily clinic hours, there will be cases where we have to do root canal treatment where the apex of the root is wide opened or not fully formed or in cases the roots are not fully formed or it can be resorbed due to any trauma.

In such cases the working length determination will go wrong or will be incorrectly measured.

And the opposite situation can also happen when the working length measured is too short all the debris, bacteria and the pulp remnants will get trapped in the canal itself (apical third of the canal), which results in more complications.

We usually measure the working length using the dental radiographs.

The working length measured using the dental radiograph depends on the conditions of the root and the periodontal tissues.

According to Wein, it says that we have to reduce -1 mm from the radiographic apex of the root if the no alveolar bone and resorption is detected.

We have to reduce -1.5 mm from the radiographic apex of the root, if alveolar bone resorption is detected.

We have to reduce -2 mm if the alveolar bone and the root resorption is detected.

But the major hassle is that it is impossible to locate the

conjunction between the cementum and the dentin with the radiographic working length determination. Also, in radiograph the adjacent roots and the structures will get superimpose each other. Due to this reason we have to combine the radiographic data with the *electronic apex locator*.

Electronic apex locator is a device used in endodontics that measure the impedance, frequency and resistance of the surrounding material in order to locate the working length of the root canal.

The correct determination of the working length is a critical factor for the determination of the root canal.

The success and accuracy of determining the working length depends on the size of the instrument, apical foramen and the root canal.

During the root canal treatment, it is always recommended to maintain the apical patency using K file instrument and makes it deeper than the working length measured. Also, this technique helps to improve the irrigation procedure and allowing the irrigation solution to reach the apex of the canal. This helps for the better outcome of the treatment concerning to post operative pain. However, this technique led to apical extrusion of the debris by the K file and cause irritation to the apical periodontal tissues leading to post operative pain.

The apical foramina enlargement is found to be the promoting factor for flare up occurrence, because it is linked to higher level of debris extrusion during treatment.

Chemical factors for post operative endodontic flare up:

The irrigative solutions used in the endodontic treatments and the intra canal medicaments, root canal filling substances are in different compositions and might be toxic. This cause chemical irritation and post operative pain and sensitivity too. The gutta-percha paste we use for filling also have different level of toxicity.

The greater the amount of filling exuding from the root canal the more intense will be the reaction.

Studies shows that flare up are commonly seen in use of resorcinol which is a formaldehyde resin used obturation in the endodontic treatment. The main drawback of formaldehyde is that it is cytotoxic, it causes necrosis to the living tissues and if they are extruded from the canal, they cause pain and swelling.

The type of solution used in the irrigation has no effect in the post operative flare up. Various studies have been conducted based on it.

In a study conducted in the year 2010 (Bashtey and Hedge 2010) showed that use of 5.25 percentage of sodium hypochlorite cause more incidence of pain compared to 2 percentage of chlorhexidine solution.

In the year 2018 a study was conducted by Riaz *et al* compared the same solution with same concentration and observed no such differences related to postoperative pain.

In 2012 another study was conducted by Fedorowicz, he compared solutions of 5.25 percentage of NaOCl, 5.25 percentage of NaOCl combined with 3 percentage of hydrogen peroxide and 5 percentage of NaOCl alone or in combination with other proteolytic enzymes. In this study the conclusion was that postoperative pain after root canal treatment is not influenced by irrigant solution.

Another study was conducted in the year 2018 by Farzaneh showed that 5.25 percentage of NaOCl was associated with lower postoperative pain compared with 2.5 percentage of NaOCl.

Recently in the year 2020 a study was conducted by Mostafa

it shows that 1.3 percentage of NaOCl is found to be less intensive and causes less postoperative pain compared to the 5.25 percentage of NaOCl.

And these finding was not matched with the study conducted by Vetma in the year 2019 with two different concentrations of NaOCl (1% and 5%) and didn't find a significant outcome in the postoperative pain.

Various studies were conducted regarding the correlation between the gender and the flare up.

Naoum and Chandler in the year 2002 conducted a study which showed that women are more susceptible to show flare up than men.

So, these are the major causes for the postoperative endodontic flareup.

Risk factors for postoperative endodontic flareup:

The risk factors for postoperative endodontic flare up are categorized into two.

- The first one is that it depends on the patient demographics, condition of pulp and apical periodontal tissues, clinical symptoms, general stat of health, tooth which is being treated.
- The second one is that it depends on the therapeutic procedures (which means several visits for the treatments), whether the treatment is primary endodontic treatment or is it any retreatment and intracanal medications.

• Demographics

The demographics include the age and gender of the patient.

There are many studies conducted based on this factor. The studies conducted in the earlier days shows that there is no correlation between the incidence of flare up and age and gender. This study was done by Walton 2002 ^[3], Onay *et al* 2015.

A report from El Mubarak in the year 2010 shows that postoperative pain exists among the people ranging between 18 to 33 years old.

A result obtained by Nair *et al* in the year 2017 showed that there exists an age factor in relation to the flare up. Patients between the age group 40 to 60 years have a higher risk of developing flare up.

Some studies conducted by Naom and Chandler 2002, Walten 2002, Ali *et al* 2016 showed that women are more susceptible to postoperative endodontic flare up compared to the men. While other studies showed no correlation of the same.

Also, when we compare this condition with the medical condition of the patients such as Diabetic Mellitus. A study done by Armada Dias *et al* in the year 2006, showed that patient with diabetic mellitus is more prone for flare up compared to the one without diabetic mellitus.

• General state of health

General state of health says that the post operative endodontic flare up is less in patients using steroids as treatment for the systemic diseases. The steroids will suppress the inflammatory response when the microbes irritate the apical periodontal tissues.

• Condition of the pulp and apical periodontal tissues.

The relation between the pulp and the apical periodontal tissues is complex.

In some studies, conducted by (Walton 2002, Siqueria 2003, Tinaz *et al* 2005) ^[5, 3] showed that necrotic pulp is related to the postoperative pain. Whereas other studies say it didn't.

The microorganisms are essential for inflammation in the peri radicular tissue, the treatment for necrotic tooth have higher flare up than the vital tooth.

Some studies shows that higher incidence of flare up is related to the vital tooth.

In the radiograph if the bone destruction is more there is a high risk for occurrence of post endodontic flare up. Bone destructions more than 5 mm shows increased incidence of occurrence of pain.

In contrast in a study conducted by (Ng *et al*) shows that teeth with a periapical lesion larger than the 3 mm is found to have less post obturation pain than teeth with a smaller tooth.

The clinical symptoms before treatment such as tooth pain when biting, chewing, having sensitivity while percussion. Most of the patients feel pain before the beginning of the treatment and after it.

The pain will enhance the stress level in the body and effects the immune function in a negative way.

It increases the probability of flare up. Temporary pain is felt more in the tooth when the canals of the molar teeth are treated compared to the other teeth. Higher frequency of pain is seen in lateral teeth due to its complex anatomy of the root canal and chemo mechanical preparations.

The endodontic treatments can be done in one or two visits.

If the pulp is viable or in cases where the endodontic retreatment where there are no visible clinical symptoms related to the changes in the peri radicular tissues. In such cases the root canal treatment can be done in one visit.

If the pulp is necrotic and there are radiographic changes in the peri radicular tissues endodontic the endodontic treatment is done by 2 visits. In the first visit the root canal is prepared chemomechanically and filled with intracanal medicaments for maximal root canal disinfections. The crown is sealed with temporary filling.

In the second visit the filling of the root canal is performed.

The studies shows that pain is more common after the one visit endodontic treatment. The post operative flare up is more in after one visit endodontic retreatment compared to retreatment by two visits.

Comparing with the preoperative and postoperative pain.

There exist an association between the pre operative and post operative pain. A study was conducted by Vieyra *et al* showed that pre operative pain is a significant factor that influence flare up.

The microorganisms present in the root canal causes the pre operative pain and the microorganisms which extrude from the root canal causes post operative pain. The post operative pain causes negative effects in the patients like stress and effects the immune system of the body.

This increases the possibility of endodontic flare up.

Tooth

The mandibular first molar is having more chances for post operative flare up as the mandibular arch have thick cortical plate compared with the maxilla mostly in the region of molars.

So that there will be more accumulation of the exudates will lead to the delaying of healing.

Irrigation

The major function of the irrigation is to disinfect the canal.

The irrigation is done with conventional manual syringe technique having needle. An extrusion of the irrigation solution beyond the apex causes post operative pain.

The use of double side vented needle is more useful in

decreasing post operative pain compared with the conventional open-ended needle.

There is no influence of depth of insertion of the irrigation needle into the canal on the occurrence of pain after endodontic treatment.

Studies shows that mechanical active irrigant devices are beneficial in reducing post operative pain and improving canal and isthmus cleanliness during Endodontics when compared to conventional irrigant.

A new technique for irrigation was introduced, mechanical active irrigation is more efficient than conventional method of irrigation. The mechanical active irrigation reduces post operative pain. And also, it improves the canal and isthmus cleanliness compared to conventional irrigation. The use of Endo Activator also reduces the post operative pain when compared to endodontic irrigating needle.

Endo Vac also reduces post operative pain compared to the conventional needle irrigation.

The ultrasonic method of irrigation is found to be more useful than the conventional endodontic syringe irrigation in reducing the post operative pain.

In 2018 a study was conducted to compare the four irrigation systems.

- Needle irrigation without agitation with a side port needle
- Sonic agitation
- Passive ultrasonic irrigation
- Manual dynamic agitation

In the above-mentioned irrigation system, the manual dynamic agitation causes greater post operative pain compared to other technique after endodontic therapy.

The use of Low-Level Laser showed good efficacy in reducing post operative pain. The use of diode and cryotherapy causes less post operative pain after endodontic treatment.

A recent study was conducted and showed many risk factors are connected to the post operative pain. If the patient comes with periapical lesions and preoperative pain there are more chances of postoperative endodontic flare up. And also, the number of visits.

The least factor for postendodontic flare up includes female gender, necrotic teeth, retreatment, analgesics.

Treatment procedure for interappointment pain

▪ **Re treatment procedure**

The definitive treatment includes retreatment procedure, the access cavity is opened, the working length must be reconfirmed, the condition of being whether the apical foramen is opened or unobstructed is conformed.

Thorough irrigation of the canal is done. All the remaining tissues, toxic substances, microorganisms, the major toxic substances are removed.

The drainage also will help for the removal of the exudatives substances from the canal.

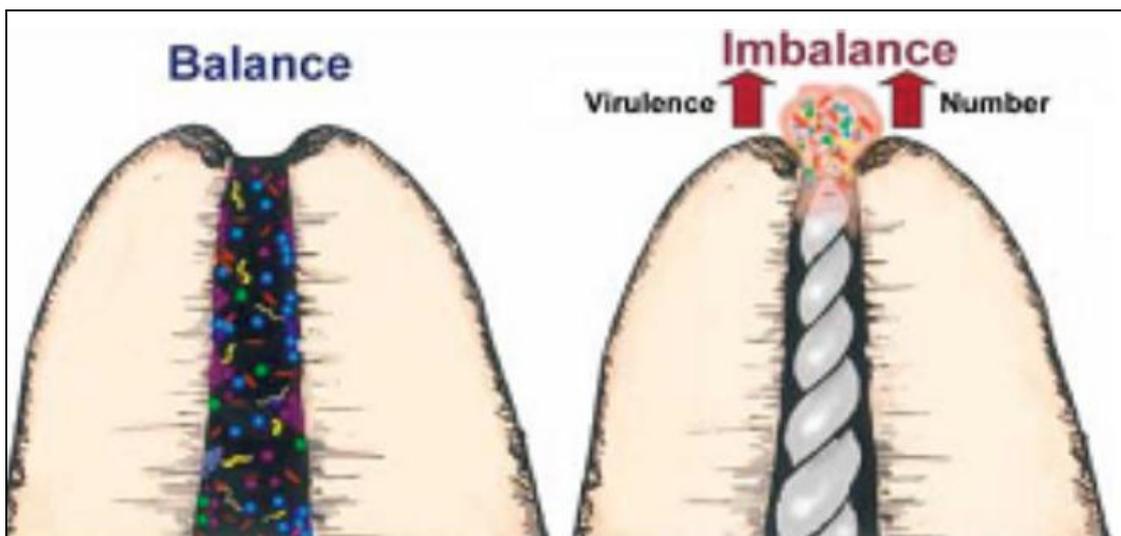


Fig 1: Apical extrusion of infected debris

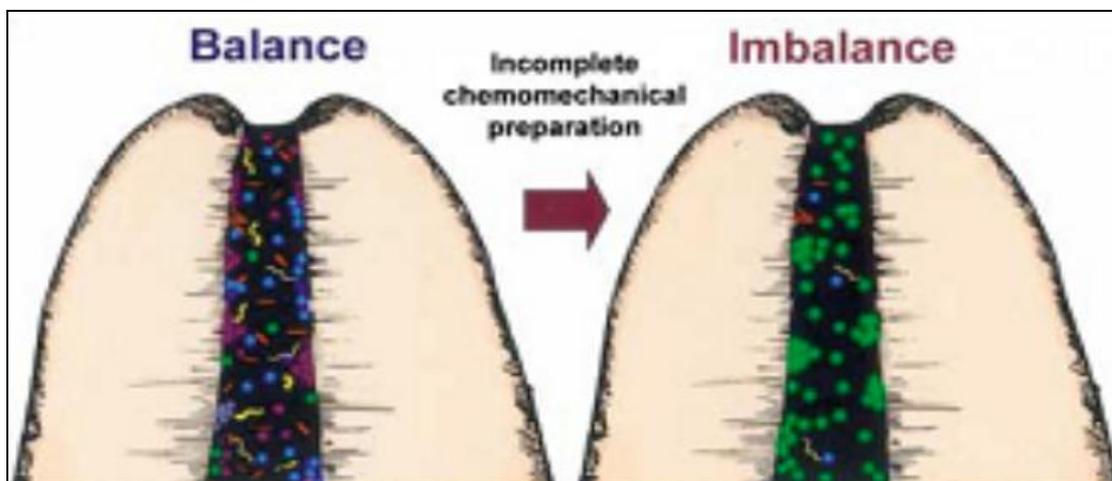


Fig 2: Changes in endodontic microbiota or in environmental condition

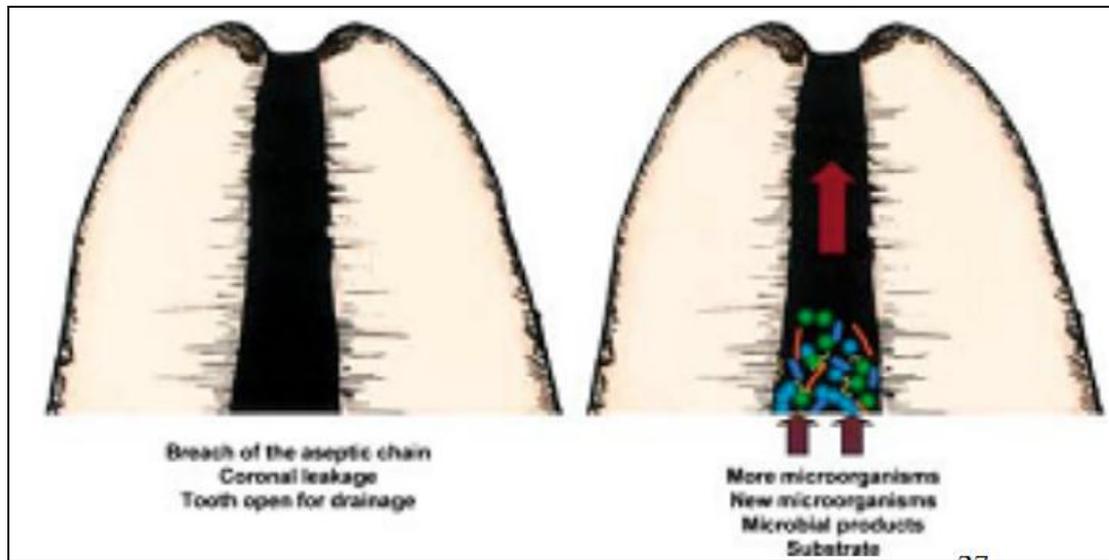


Fig 3: Secondary intraradicular infections

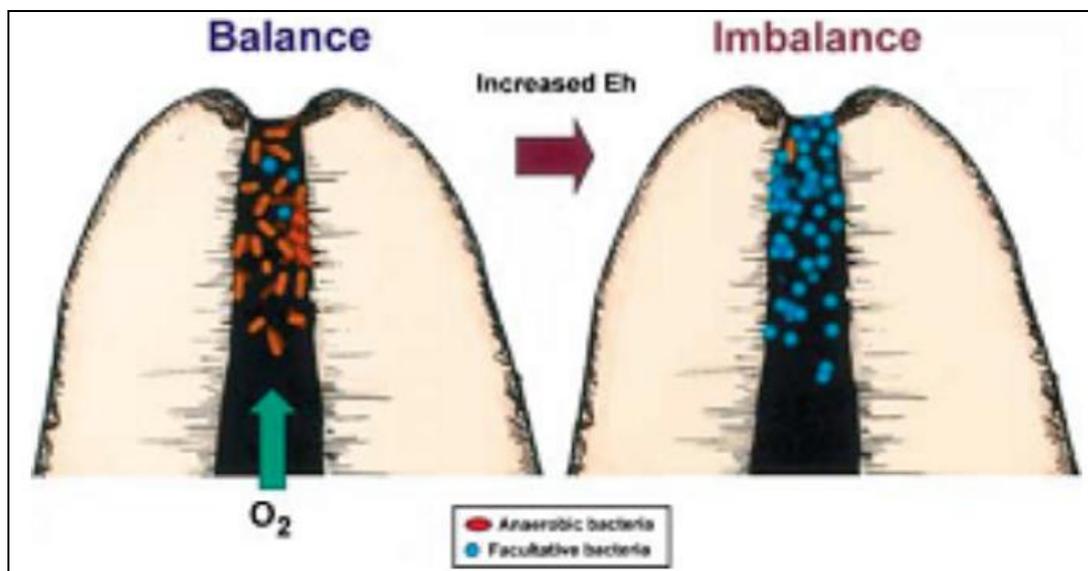


Fig 4: Increase of the oxidation reduction potential

- **Incision and drainage procedure**

Incision and drainage are a procedure in which all the pus, toxic microorganisms, toxic products are removed from the peri apical area. If the root canal treatment is incomplete these toxic products get subsided in the canal. The root canals are reentered to eliminate the etiological factors through debridement, irrigation and placement of antimicrobial dressing.

In cases such as the abscess had occurred after the obturation procedure, incision of the tissue is the only emergency procedure.

If the canal is poorly filled, the incision and drainage is done, the filling material is removed in order to allow for additional pus drainage through the root canal space.

In cases such as cellulitis additional incision for drainage is done.

- **Intracanal medicament**

Clinical studies showed that use of formocresol, camphorated paramonochlorophenol, eugenol, iodone potassium iodide, Ledermix or calcium hydroxide is neither prevented nor relieved by medicaments for post treatment pain.

The use of intracanal medicaments such as steroids, NSAID (non steroid anti-inflammatory drugs), corticosteroids,

antibiotic compound causes post treatment pain.

Placement of Dexamethasone and Ketorolac in the root canal of vital teeth after pulpectomy cause significant pain relief at the time of 12 hours. The placement of intracanal medicaments does not cause any side effects or adverse reactions.

Postoperative administration of Oral methylprednisolone did not significantly reduce pain in patients with necrotic and symptomatic tooth. Occlusal reduction can also be done for the purpose of post operative pain. Application of Photo biomodulation therapy after endodontic treatment causes a significant decrease in post operative pain.

- **Occlusal reduction**

Occlusal reduction is the minimal agreement in the dental literature to prevent the post endodontic pain. If the patient comes to you with pain in the tooth while biting then the occlusal reduction is effective in reducing the pain. Patient complaining of sensitivity to biting and chewing due to increases levels of inflammatory mediators that stimulate peri radicular nociceptors.

The occlusal reduction will alleviate the continued mechanical stimulation of the sensitized nociceptors.

• Cortical trephination

Cortical trephination is a procedure of surgical perforation of the alveolar bone which is done to remove the accumulated peri radicular tissue exudates.

Various studies have been done to measure the effectiveness of the cortical trephination. This is done to prevent and relieve post operative pain.

A report done by Chestner *et al* says that pain relief in patients with severe and recalcitrant periradicular pain when cortical trephination was done.

• Drugs

Antibiotic

According to Fouad who has written in his review that systemic antibiotic for the control of post treatment pain is without any justification. However, it is prescribed frequently to treat endodontic pain.

Non-narcotic analgesics

The use of non-narcotic analgesics, NSAIDS and acetaminophen have effectively used to treat the endodontic pain. They produce analgesia by acting in both peripherally inflamed tissues and in regions of brains and spinal cord.

The treatment includes Ibuprofen 600mg taken every 6 hours which is optimal for managing the pulpal and peri radicular pain. A combination of NSAID and acetaminophen taken together show additive analgesia for treating dental pain.

Non-Narcotic analgesia, NSAID and acetaminophen have been effectively been used for patients to treat patients with endodontic treatments.

For those patients who are allergic or sensitive to NSAID or aspirin and in those who have gastro intestinal ulcerations or hypertension due to renal effects of NSAID, acetaminophen should be considered for post treatment pain.

For cases such as irreversible pulpitis pre treatment medications NSAID reduces the pulpal pain and peri radicular levels of inflammatory mediator prostaglandin (PGE₂).

Intake of NSAID alone can relieve most of the pain. Combination of NSAID along with acetaminophen gives best analgesia for treating dental pain. If the pain of the patient is not controlled by NSAID and acetaminophen narcotic analgesia can be used. They are given in combination with NSAIDs for additive effects.

Post operative administration of oral methylprednisolone did not significantly reduce pain in patient with necrotic or symptomatic tooth.

Preoperative medicine intake for post operative pain management

A detailed description of preoperative medicine intake for post operative pain management is given below.

The preoperative medicine is very effective in reducing post operative pain.

- Single dose of piroxicam, dexamethasone, deflazacort. These medications showed an effect of reducing pain after endo treatment.
- Ibuprofen, dexamethasone, diclofenac sodium administered before the treatment can also help too.
- Administration of tramadol and dexamethasone submucosal injection will also reduce post operative pain.
- In case of patients with symptomatic irreversible pulpitis prednisolone can reduce pain in single dose.
- Administration of Ibuprofen 400mg or ketorolac 20 mg in patients with irreversible pulpitis reduce pain after treatment with ketorolac.

- At the same time buccal filtration of ketorolac in cases can also have pain suppressive effect.
- Acupuncture also has a beneficial effect on relieving pain suppression if administered prior to treatment in teeth with apical periodontitis.
- The recent studies shows that prophylactic administration of antibiotics have no effect in preventing post operative pain in patient with necrotic teeth.

Preventive measures to be taken to prevent post operative pain

The flare up is caused by many etiological factors mentioned above, preventive measures is must. Till now no preventive measures have been approved scientifically and adopted by endodontic community. We can follow some instructions to prevent the post endodontic flare up.

Asepsis is a condition of absence of microorganisms, virus, bacteria. It is a condition where no disease-causing microorganisms are present. Asepsis covers all the procedures reduce the risk of bacteria, fungal or viral contamination.

The use of rubber dam using the endodontic treatment helps to reduce post operative endodontic flare up.

Asepsis is the key success to endodontics, avoiding contamination.

Chemo mechanical procedure of root canal treatment helps for producing lesser amount of debris extrusion in the peri radicular area.

It helps for complete debridement of root canal system. The crown down technique mentioned above with engine driven NiTi system and proper irrigation.

Proper apex locator must be used and working length has to be measured.

- List of preoperative medicines
- Ibuprofen
- Dexamethasone
- Diclofenac sodium
- Piroxicam
- Deflazacort
- Ketorolac or prednisolone

Endodontic treatment tried to be done in one visit and do intracanal medications between sessions for infected tooth. The use of corticosteroids, NSAID and paracetamol is very efficient in controlling pain.

What is the treatment of flare up in different clinical conditions?

- **Previously vital pulp (with or without complete debridement)**

After the endodontic appointment the vital pulp will develop an acute apical abscess. This shows that the pulpal remnants have become necrotic and are invaded by the bacteria. With the sodium hypochlorite solution, the canals are cleaned and the working length are rechecked.

The canals are opened, rechecked, debrided and medicated with calcium hydroxide paste and closed.

In complicated cases they are managed with incision and drainage.

- **In cases of previously necrotic pulp and no swelling**

In cases of previously necrotic pulp and no swelling acute apical abscess will be present and it is confined to the bone and it is very painful. The canals are cleaned, irrigated with sodium hypochlorite and proper drainage has to be

maintained.

- In case of previously necrotic pulp with swelling, this case is condition of true flare up. Prescription of analgesic will reduce the pain. Nothing will be gained by opening the canal and the pain will get regress spontaneously.

Post obturation emergencies

Post obturation emergencies are rarely seen and if present active intervention must be done. Treatment with mild analgesics has to be started to control patient anxiety. In cases of root canal treatment with acute apical abscess excision and drainage of the swelling will resolve and administer analgesics.

Conclusion

Even though there is a development in endodontics field, endodontic flare up occurs. The occurrence of flare up after endodontic treatment is 1.4% to 16%.

Microorganisms are major causative agent for flare up. The occurrence of flare up is extremely undesirable for both patient and dentist. The dentist must follow proper guidelines and measures to prevent the occurrence of post operative flare up. The etiological factors of post endodontic flare up which is mechanical, chemical and microbial is directly interdependent.

The occurrence of flare up is also determined by demographic, conditions of pulp and periapical, state of health, clinical symptoms, number of visits etc.

These all factors are influenced by endodontic flare up, prevention cannot be guaranteed by following a specific treatment protocol.

References

1. Walton R, Fouad A. Endodontic interappointment flareups. A prospective study of incidence and related factors. *J Endod.* 1992;18:172-177.
2. Seltzer S, Naidorf I. Flare-ups in endodontics I. Etiology factors. *J Endod.* 1985;11:472-278.
3. Richard E. Walton. Interappointment flareups: incidence, related factors, prevention, and management. *Endodontic topics.* 2002;3:67-76.
4. Rosenberg PA, Babick PJ, Schertzer L, Leung A. The effect of occlusal reduction on pain after endodontic instrumentation. *J Endod.* 1998;24:492-496.
5. Siqueria Jr JF. Microbial Causes of endodontic Flare-ups. *IEJ.* 2003;36:453-463.
6. Iqbal M, Kurtz E, Kohli M. Incidence and factors related to flare-ups in a graduate endodontic programme. *Int Endod J.* 2009;42:99-104.
7. Gondim E Jr, Setzer FC, Dos Carmo CB, Kim S. Postoperative pain after the application of two different irrigation devices in a prospective randomized clinical trial. *J Endod.* 2010;36:1295-301.
8. Genet JM, Hart AA, Wesselink PR, Thoden van Velzen SK. Preoperative and operative factors associated with pain after the first endodontic visit. *Int Endod J* 1987;20:53-64.
9. Yingling NM, Byrne BE, Hartwell GR. Antibiotic use by members of the American Association of Endodontists in the year 2000: report of a national survey. *J Endod* 2002;28:396-404.
10. Baumgartner JC, Hutter JW. Endodontic microbiology and treatment of infection. In: Cohen S, Burns RC, eds. *Pathways of the Pulp*, 8th edn. St. Louis: Mosby. 2002,

501-520.

11. Moskow A, Morse DR, Krasner P, Furst ML. Intracanal use of a corticosteroid solution as an endodontic anodyne. *Oral Surg Oral Med Oral Pathol.* 1984;58:600-604.
12. Breivik EK, Barkvoll P, Skovlund E. Combining diclofenac with acetaminophen or acetaminophen-codeine after oral surgery: a randomized, double-blind single dose study. *Clin Pharmacol Ther* 1999;66:625-635.
13. Rosenberg PA. Clinical strategies for managing endodontic pain. *Endod Top* 2002;3:78-92.
14. Torabinejad M, Kettering JD, McGraw JC, Cummings RR, Dwyer TG, Tobias TS. Factors associated with endodontic inter appointment emergencies of teeth with necrotic pulps. *J Endod.* 1988;14:261-6.
15. Van Winkelhoff AJ, Carlee AW, de Graaff J. *Bacteroides endodontalis* and others black-pigmented *Bacteroides* species in odontogenic abscesses. *Infect Immun* 1985;49:494-8.
16. Nist E, Reader A, Beck M. Effect of apical trephination on postoperative pain and swelling in symptomatic necrotic teeth. *J Endod.* 2001;27:415-20.