

# Management of a flare up case after endodontic treatment procedure

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## ABSTRACT

A flare-up is defined as a pain and/or swelling of the soft tissues that occurs within a few hours or a few days following the root canal treatment. In some cases, the flare-ups can appear after the finishing of the root canal treatment, due to the penetration or development of the microorganisms into the root canal. The pain felt by the patient depends on the extent of the periradicular tissue injury, its severity and intensity of the inflammatory immune response. The article discusses the microbial irritation of apical periodontal tissue caused by insufficient instrumentation and filling of the root canals, factors that lead to failure of the outcome of root canals treatment.

**Keywords:** endodontic treatment, flare-up, root canal infection

## INTRODUCTION

Flare-ups represents an acute exacerbation of an asymptomatic condition, caused by mechanical, chemical or microbial injury to the pulp or periradicular tissues. The patient can be in pain and/or swelling within a few hours or a few days following the root canal treatment [1]. After endodontic treatment, the flare-up can lead to pain of various intensity [2]. The frequency of post-endodontic pain can vary from 1,4% to 16% [3,4] and up to 50% [4-6]. Also, the extent of undesirable effects for the patient depends on the periradicular tissue injury and intensity of the inflammatory response. Microorganisms in the root canal, especially in its apical part, are the most important factor that causes the irritative response of human immune system: vessels dilate, permeability increases and chemotaxis takes place [3]. If the root canal is not well chemomechanical prepared and filled, microorganisms in the root canal system change and therefore increase their virulence, causing inflammatory response [7].

The predominant strains of microorganisms are anaerobic, they can hide mostly in 5 mm of the apical area, in accessory canals and apical delta and are represented by *Parvimonas micra*, *Eubacterium*, *Prevotella gingivalis*, *Prevotella endodontalis* and *Prevotella* [8]. After endodontic treatment, the microbes in the root canal can enter via temporary coronar filling left in place over two weeks or cracked permanent coronal restoration [9].

## CLINICAL CASE

A healthy 42-years male presented to the dental office with pain and swelling in the second lower molar (47). An objective exam revealed intensive pain in bite and fistula. At radiograph examination one can see a great loss of periapical tissue, classified as PAI 4 score (Figure 1).

PAI is a visual radiographic index defined by Ørstavik et al, 1986, consisting of five scores representing a scale from healthy periapical bone to destructive apical periodontitis [10]. Scores 1 and 2 rep-

resent healthy periapical bone and scores 3, 4 and 5 represent apical periodontitis, as follows [10]:

Score 1: normal periapical tissues

Score 2: little bone structural changes, but not apical periodontitis yet

Score 3: bone structural changes beginning, with some reduced loss, characteristic of apical periodontitis

Score 4: well-defined radiolucency

Score 5: radiolucency with great expansions in periapical and adjacent tissues.

The first appointment was reserved for emergency procedures: local anesthesia at Spix spine, application of rubber dam, endodontic drainage, copious irrigation with 2% chlorhexidine, minimal rotary instrumentation using ProTaper Universal system (Dentsply Sirona) till F1 instrument (20,.07),  $\text{Ca(OH)}_2$  dressing and temporary sealed coronal filling with Ketak Molar (3M ESPE, Germany). As the drainage was successful, we only give to the patient general anti-inflammatory and painkiller medication for 3 days only (Ibuprofen a 200 mg and Paracetamol a 500 mg, twice to four times a day).

After one week, the pain and swelling were absent and the fistula was gone. In the second appointment the root canal disinfection and chemomechanical preparation have been completed, till F2 instrument (25,.08). No apical patency was performed. After copious irrigation with 5,25% sodium hypochlorite and EDTA 17%, the tooth was filled using cold lateral condensation technique with a master F2 cones on all three root canals and accessory cones and Canason sealer (Vocco, Germany) (Figure 2). The permanent coronal restoration was performed by applying a restorative composite Filtek Z250 (3M ESPE, Germany).



FIGURE 1. Preoperativ rx – periapical lesion, PAI 4



FIGURE 2. Postoperative rx

After 6 months, the patient came again to the dental office with mild pain symptoms in the same region and bite pain on 47 tooth. No swelling or fistula were noted at clinical exam. The integrity of coronal restoration was good, with no signs of leakage. The radiographs examination revealed a smaller radiolucency area on periapical tissues of 47, classified as PAI 3 (Figure 3). The decision has been taken to retreat the tooth, because it seems that the apical part of the canals was poorly sealed.



FIGURE 3. x-ray at 6 months, flare-up, PAI 3

The retreatment procedures were done using ProTaper Retreatment files, D1 (30,.09), D2 (25,.08) in the coronal and median part and D3 (20,.07) in the apical part of the canal, avoiding using solvents during retreatment, because of the risk to extrusion

in the periapical tissues. The root canals were chemomechanical prepared till F3 instrument (30,.09) on all three root canals and apical patency was performed. After placing an interappointment dressing of  $\text{Ca}(\text{OH})_2$  for one week the tooth was filled by continuous wave of condensation using System B (SybronEndo). In the down-pack stage a master F3 gutta-percha cones were used and the rest of the canals were filled with System B gun in the back-fill stage. The sealer used was AH Plus (Dentsply De-Trey, Germany). The post operative X-ray revealed a complete root canal filling, with small puffs around the terminus points of the canals (Figure 4). Coronal restoration was performed with Filtek Z250 composite for posterior teeth.



FIGURE 4. x-ray after retreatment

The patient was called at 6 month for checking the results of the new treatment. At that point the clinical symptoms were absent, the tooth was completely functional and the radiograph showed a completely healed lesion, with normal periapical tissues (Figure 5). The result was classified as PAI 1 and the final treatment was considered a success.

## DISCUSSION

The quality of root canal treatment and filling have an important influence in treatment outcome, especially in the presents of apical voids [11]. Anterior studies revealed that both teeth with vital and non-vital pulp filled with warm vertical condensation lead to superior healing rate than those filled using single cone or cold lateral condensation, rate that varies from 4% [12] to 10% [13,14] and up to 20% [15]. However, these studies did not find statistical differ-

encies between cold and warm filling techniques, that means shaping, cleaning and disinfection of root canal system are more important than root filling technique per se (Kojima et al., 2004) [16].



FIGURE 5. x-ray at 6 months, PAI 1

In the presented clinical case, the insufficient preparation and disinfection of the apical part of large root canals may lead to this result. Other factors may be the lack of apical patency and the poore cold lateral condensation technique, that left in place many voids with residual microorganisms. The apical patency proves the lack of clogging the apical constriction and foramen with dirt and mug, although it is a controversial procedure (Ng et al., 2011) [17].

Warm vertical condensation is considered to be a very successful technique because during these procedures the residual microorganisms may remain entombed into the well compacted gutta-percha and therefore cannot cause future reinfection of the endodontic system. Moreover, AH Plus, an epoxy-resin based sealer, for its superior homogeneity and structural characteristics to zinc-eugenol like sealers, seems to be able to fill and seal the dental tubules and accessory canals, leading to a superior healing rate of periapical lesions. Also, the temperature rise which happens during warm vertical condensation increases the flowing rate of epoxy resin sealers (Hu et al., 2022) [18].

## CONCLUSIONS

The insufficient preparation, disinfection and obturation of the apical part of root canal system may lead to apical periodontitis. Retreatments using rotary instrumentation, copious irrigation and warm vertical condensation lead to superior healing rate.

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