Endodontic Treatment of Upper Central Incisors

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Summary

This paper describes endodontic treatment of first central upper incisors which have been unsuccessfully treated for a long period as a consequence of inadequate procedure. The root canals of the problematic teeth were obturated for seven days, by correct proper endodontic treatment.

Three months after root canal obturation, the teeth were without symptoms.

Key words: *endodontic treatment, incisors.*

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Introduction

Cleaning and shaping endodontic spaces is a great challange and one of the hardest steps in endodontic treatment. During instrumentation indications and principles of endodontic therapy must be respected (1-3).

Cleaning and shaping of endodontic spaces could be divided into the coronar phase and the radicular phase. During the coronar phase existing carious tissue should be removed, precise access preparation with well exposed root canal orifice should be performed. After which the pulp tissue should be extirpated from the pulp chamber (4, 5). The radicular phase includes cleaning and shaping of the root canal spaces using a chosen instrumentation technique (5).

The principles of root canal instrumentation are (2, 3):

1. Harmless instrumentation
2. Cleaning of the endodontic space *in toto*
3. Shaping a tapered root canal, which makes possible three-dimensional hermetic filling of the root canal spaces
4. Avoid overinstrumentation of the apical constriction and keeping it in the original position.

To achieve these principles, it is necessary to have a good knowledge of the morphologic characteristics of endodontic spaces.

Case report - I

A female patient (26 years old) was admitted to the Department of Oral Surgery at the Clinical Hospital "Dubrava" for apicotomy of tooth 21 (diagnosis: *chronic apical periodontitis*). For more than two years this tooth had been treated endodontically without success, and the dentist asked for surgical help. The Oral surgeon referred the case to the Department of Dental Pathology, School of Dental Medicine, University of Zagreb to make one more attempt of endodontic treatment.

First visit

After examination and taking the case history, it was obvious that access preparation performed in the previous treatment was too small and not sufficient for cleaning the endodontic space.

The tooth was not temporally filled and the cavity was full of debris. It was clear that the destructive process had spread from the crown to the cervical portion of the root dentin walls. Differential diagnosis was *pulpitis chronica granulomatosa interna* (Figure 1). A rubber dam was placed and exact access preparation, triangular in shape was performed.

The base of the triangle was towards the incisal margin which facilitated the total removal of the necrotic tissue and soft dentin from the pulp chamber and proper access to the root canal (Figure 2). Cavity disinfection was performed with 2.5% solution of sodium hypochlorite and the cavity dried with a sterile cotton pellet.

After the coronar phase of endodontic treatment, the canal orifice was shaped with a Gates Glidden drill # 5 (Figure 3). The root canal was instrumented, using Step back technique (5) and Endometer ES-02 to determine the length of the root canal (6). Twenty mililiters of 2.5% solution of sodium hypochlorite were used for irrigation of the root canal space. Master apical file was # 60 and its position in the canal was radiographically registrated (Figure 4). The canal was irrigated, dried and temporarily filled with Calasept (SPEIKO, Münster, Germany). The opening cavity was temporarily filled with Cavit W (ESPE, Seefeld, Germany). The next appointment was scheduled for seven days.

Second visit

The patient came back after two days complaining of sensitivity of tooth 21. Clinically, the tooth was slightly painful on percussion and no swelling was found. The canal was irrigated, dried and temporarily filed with Calasept. The open cavity was filled with a sterile cotton pelet and Cavit W.

Third visit

The patient came back five days after the second visit without complaining. The rubber dam was placed in position and the temporary filling removed. The root canal was irrigated with Calcinase solution (Lege artis, Dettenhausen, Germany) and 2.5% solution of sodium hypochlorite along with filing off the root canal walls with a Hedstroem file # 60 (7). The canal was then obturated with gutapercha points and Diaket paste (ESPE, Seefeld, Germany) using the cold lateral condensation filling technique (8).

Radiographic control was performed after preparation of the canal for the post (Figure 5) and postendodontic treatment was recommended.

Three months after root canal obturation there was no evidence of any complications (pain or swelling).

Case report - II

First visit

A male patient (20 years of age) came with a problematic tooth 21 which had been endodontically treated unsuccessfully for more than three months. Diagnosis was *chronic apical periodontitis*.

A rubber dam was placed in position, correct opening access preparation was performed and necrotic tissue removed from the pulp chamber. Root canal cleaning and shaping were performed using standard technique up to file # 140. The canal was irrigated with approximately 20 mililiters of 2.5% solution of sodium hypoclorite, dried and filled with Calasept. The cavity was temporarily filled with a sterile cotton pelet and Cavit W.

Second visit

The patient came back after seven days. The tooth was painless. The rubber dam was placed in position, the temporary filling removed, the canal was irrigated, dried and obturated with gutapercha points and Diaket paste using the cold lateral condensation filling technique (8) (Figure 6). The root canal filling was radiographically controlled (Figure 7).

After three months there was no evidence of any complications from the root canal therapy.

Discussion

In clinical work failures in endodontic treatment can be seen. The most common mistakes are inad-

equatly located and too small access cavity preparation with unremoved carious dentin and roof of the pulp chamber. Consequently, necrotic pulp tissue can be found. Canal orifice shaping, instrumentation and obturation of the root canal are most often incorrectly performed.

To overcome these failures, many dentists use intracanal medications as phenols, tricresolphormalin, calcium hydroxide, corticosteroids and antibiotics (1, 9). On the other hand, some dentists obturate root canals using antiseptic pastes. Such pastes have prolonged, but toxic effects (1). The result of such work is an unsuccessful long period of endodontic therapy.

However, intracanal medications are helpful in eliminating the microorganisms that survive inside the root canal even after careful chemomechanical preparation (10). Theoretically, all microorganisms present in a human oral cavity may invade the root canal and participate in endodontic infection. However, because of the interactions of microorganisms and varying oxygen pressures inside the root canal, the predominant bacterial flora are obligate anaerobes, mainly G "-" bacilli, such as black-pigmented rods and fusobacteria (11).

Facultative anaerobes also are commonly isolated from infected canals (11). These remaining microorganisms grow and multiply inside the endodontic space if no antibacterial dressing has been used between the endodontic appointments. Antibacterial dressing reduces intracanal microorganisms and therefore favours periapical tissue repair (9).

Calcium hydroxide medications are the most usable intracanal antibacterial dressing today. Calcium hydroxide has been shown to be effective in eliminating bacteria from the root canal space (9, 12). Its high pH has a destructive effect on bacterial cell membranes and protein structures (9).

Sodium hypochlorite (2.5% solution) is used for root canal irrigation. It acts as a disinficating and lubricating agent, dissolves organic tissue and cleans the root canal space mechanically (5). It is particulary important in lateral and accessory canals, which are unavailable for mechanical instrumentation.

Calcinase (ethylenediamine tetraacetil acid) has a triple effect. First, it is a chelator that removes metallic ions (such as calcium) by binding them chemically (5). Second it removes the smear layer on the walls of the canal after canal preparation (5). Finally, calcinase helps to remove the calcium hydroxyde medications from the walls of the root canal (7).

Conclusion

Endodontic treatment correctly performed in aseptic conditions leads to elimination of infection from the endodontic space. This helps the human organism to win the "battle" against microorganisms which cannot be achived by mechanical instrumentation and irrigation during the canal preparation. This is very important in thecase of the microorganisms in periapical tissue and round lateral canals.