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Non-Surgical Retreatment as a Management in Previously Treated Tooth With Chronic Apical Abscess

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ABSTRACT
Introduction. The success of root canal treatment influenced by four factors. Absence of pre-treatment periapical lesion, root canal filling with no void, obturation to within 2mm of the apex, and adequate coronal restoration. Inability to reach those conditions can lead to root canal treatment failure. Forming of chronic apical abscess is one of root canal treatment failure symptom. Non-surgical retreatment is still the main choice of root canal failure management with high success rate. The aim of this case report is to evaluate non-surgical retreatment as a management of previously treated tooth with chronic apical abscess. Case reports. A 21 years old female patient presented to the conservative dentistry clinic in RSGM Prof. Soedomo complaining about a broken lump with pus in her anterior region gum. Fistulograph was taken and showed that apical abscess formed in right maxillary central incisor that undergo root canal treatment 2 years ago with underfilling obturation and inadequate coronal restoration. Non-surgical retreatment has done followed with direct composite restoration. Three months observations were made to see the healing of the periapical tissues. Conclusion. Non-surgical retreatment can be chosen as a management in previously treated tooth with chronic apical abscess.

Keywords: *fistulograph; root canal treatment failure; underfilling obturation*

1. INTRODUCTION

The success of root canal treatment influenced by four factors. Absence of pre-treatment periapical lesion, root canal filling with no void, obturation to within 2mm of the apex, and adequate coronal restoration. Inability to reach those conditions can lead to root canal treatment failure [1]. An endodontically treated tooth should be evaluated clinically as well as radiographically for its root canal treatment to be deemed successful [2].

Although root canal treatment has high success rate, failures may still be occur and post root canal treatment disease can develop. The failure rate of root canal treatments has been reported to be 14 to 16% [3]. Poor technique can also be the reason of treatment failure. These include errors in length (i.e., overfill and underfill), errors in cleaning and shaping (i.e., ledge formation, apical transportation, perforations, and instrument fracture), and errors in quality of obturation (i.e., voids, lack of uniform and continuous taper, and lack of homogeneity). Certain errors have undoubtedly been revealed to have a significantly negative impact on the final outcome [4].

Furthermore, root canal treatment failure may be required due to reinfection of the root canal caused by coronal or periapical leakage [5]. Microorganisms may invade the obturated canal space after treatment, causing infection that can lead to periapical abscess formation [1].

In cases of treatment failure, non-surgical retreatment, surgical procedures, or tooth extraction may be chosen [3]. Non-surgical retreatment is one of the best approaches in management of root canal treatment failures with a success rate of 74 to 98%, thus it should be considered only for teeth in which technical management seems feasible, periodontal support is sufficient, and the tooth can be restored to function [6,7].

The aim of this case report is to evaluate non-surgical retreatment as a management of previously treated tooth with chronic apical abscess.

2. CASE REPORT

A 21 years old female patient presented to the conservative dentistry clinic in RSGM Prof. Soedomo complaining about a broken lump with pus in her anterior region gum with no pain in her upper anterior teeth. Patient said that she had root canal treatment in one of her upper anterior tooth 2 years ago.

During inspection, a fistule shown in tooth 21 labial gingiva, composite restorative shown in mesial and distal area of tooth 21 and mesial area of tooth 11, and temporary restorative material shown in palatal area of tooth 11 (Figure 1,2). During clinical examination, both tooth 11 and 21 non-responsive to the pulp vitality test, and tooth 11 had a painful response to percussion.

A sterile gutta percha point punctured to the fistule, and fistulograph was taken. Radiograph shown that the origin of the fistule is a radiolucent area on the periapical area of tooth 11 that previously treated with underfill obturation (Figure 3). Tooth 11 diagnosed with previously treated tooth with chronic apical abscess, and non-surgical retreatment was indicated.

After fistule drainage done, patient was explained about the treatment procedure that will be done and patient signed the informed consent. Root canal access opening done from palatal cavity that had temporary restorative material on it. Obturation materials removed using *Protaper Universal Retreatment System (Dentsply Mailefer)* then root canal irrigated with 2,5 % Sodium Hypochlorite and Saline solution.

Working length measured using K-file and electronic apex locator, then confirmed with radiograph (Figure 4). Root canal preparation done with step back technique, and Calcium Hydroxide applied as an intracanal medicament. The cavity was sealed with temporary restorative material.

Second visit had done 1 week later. Patient had no pain complain. Clinical examination shown that temporary restorative material was in good condition, and tooth 21 still sensitive to percussion. Calcium hydroxide cleaned from the root canal and root canal irrigated with 2,5 % Sodium Hypochlorite. Calcium hydroxide reapplied and sealed with temporary restorative material.

Third visit had done 1 week later. Patient had no pain complain. Clinical examination shown that temporary restorative material was in good condition, and tooth 21 is not sensitive to percussion anymore. Calcium hydroxide cleaned from the root canal and root canal irrigated with 2,5 % Sodium Hypochlorite, 17% EDTA, and saline respectively. Final irrigation done with 2% Clorhexidine digluconate. Root canal dried using paper point, then obturated using lateral condensation technique with epoxy resin-based sealer (*Aha Plus, Dentsply Mailefer*). Coronal seal done with resin modified - glass ionomer cement (*Fuji II LC, GC*) and radiograph was taken to evaluate the obturation result (Figure 5).

Fourth visit had done to fix the old restoration in mesial area of tooth 11. Patient had no complain about the root canal treatment, and tooth 11 was not sensitive to percussion. Restoration done with direct composite resin (*Herculite Precise, Kerr*) and polished with polishing disk (*Soflex, 3M*) and composite polishing system (*Diacomp Twist, Eve*) (Figure 6).

Patient came for follow up after 6 months. Patient satisfied with treatment result and had no complain. Radiograph taken and showed that radiolucent area in periapical area is getting faded compared to the initial radiograph (Figure 7).

Figure 1. Tooth 11 before treatment.

Figure 2. Temporary restorative material in palatal area of tooth 11.

Figure 3. Fistulograph (Gutta percha point showed the origin of the fistule).

Figure 4. Working length determination (Root canal has cleaned from previous obturation material).

Figure 5. Periapical radiograph of root canal obturation.

Figure 6. Periapical radiograph after 6 months follows up.

Figure 7. Final Restoration.

3. DISCUSSION

Bacterial elimination from the root canal system holds the key to a successful root canal treatment. The primary determinant to achieve this and to prevent future encroachment of bacteria is a thorough and meticulous technique [4]. In this case, chronic abscess formation post treatment may be caused by the underfill obturation and inadequate coronal restoration, thus microorganisms can easily enter the root canal system from coronal and apical. A study shown that for every 1mm loss of working length, in teeth with apical periodontitis, failure rate increases by 14%. Underfill itself has been shown to reduce success rate to a mere 68% [4]

Chronic apical abscess is an inflammatory lesion of pulpal origin that is characterized by the presence of a long-standing lesion that has resulted in an abscess that is draining to a mucosal (sinus tract) or skin surface. The abscess has “burrowed” through bone and soft tissue and form a sinus tract stoma on the oral mucosa [8]. An intraoral fistula is a pathologic communication between the cutaneous surface of the gingiva and the oral cavity. Chronic dental periapical infections cause the most common intraoral and extraoral fistulas [9]. Chronic apical abscess is usually asymptomatic, and usually the tooth is not sensitive to biting pressure but can “feel different” to the patient on percussion [1].

Non-surgical retreatment option will require removal of previous restorative and obturation materials, thus affords the opportunity to eliminate any microorganisms that may have been left behind during the initial treatment and those microorganisms that may have entered the root canal system after the initial treatment [8]. Therefore, successful retreatment depends on total removal of obturation materials from the entire root canal system to allow proper contact between irrigants and intracanal medicaments to root canal walls [10].

After removal of irritants, inflammatory responses decrease and tissue-forming cells (fibroblasts and endothelial cells) increase; and finally, tissue organization

and maturation ensue. Bone that has resorbed is replaced by new bone; resorbed cementum and dentin are repaired by cellular cementum. The periodontal ligament, which is the first tissue affected, is the last to be restored to normal architecture [8].

Studies were done on the success rate of root canal retreatment, looking at the presence or absence ndoof periapical lesions. The conclusion is that, in case of periapical lesions's absence, the success rate can be very high, while in the cases where lesions were present, the success rate varies from a minimum of 31,8% to a maximum of 85% [11].

The outcome of retreatment can be divided into short-term and long-term. The *short-term outcome* may be associated with postoperative discomfort including pain and swelling. *Long-term outcome* of retreatment depends on regaining the canal patency and the obturation of the root canal system [12]. Suggested follow-up periods range from 6 months to 5 years; 6 months is a reasonable interval for a recall evaluation for most patients. There is good evidence that a radiographic lesion that is unchanged or has increased in size after 1 year is unlikely to ever resolve; therefore the treatment is deemed unsuccessful. If at 6 months the lesion is still present but smaller in size, there is an indication that it might heal but additional recall is needed [8].

4. CONCLUSION

Non-surgical retreatment can be chosen as a management of previously treated tooth with chronic apical abscess. The successful of the non-surgical retreatment depends on total removal of obturation materials from the entire root canal system.

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