

Case Report

Endodontic retreatment of premolar with an impediment

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ABSTRACT

Background: Root canal treatment can fail due to several causes. One of them is root canal calcifications. **Purpose:** To explain root canal retreatment technique in premolar with calcification. **Case:** A 65 years old female patient came to universitas airlangga dental hospital with a chief complaint of pain on tooth number 34 and 35. Tooth number 34 and 35 had an old restoration with secondary caries. Both teeth did not respond to vitality test. Both teeth were tender on percussion and bite test. Surrounding soft tissue was normal. Radiograph image reveals inadequate root canal obturations on both teeth and a periapical lesion on tooth 35. **Case Management:** Old restoration and root canal filling material was removed, then root canal retreatment was performed. Subsequently the tooth was restored with fiber post and zirconia crown. Old restoration has to be removed gently in order to prevent further damage to tooth structure. Root canal filling material can be removed with heated instruments, solvent, and rotary instruments. After root canal filling material removal, the remaining root canals need to be thoroughly shaped, cleaned, and sealed. **Conclusion:** Root canal retreatment on premolar with an impediment can be successfully performed with appropriate instruments, materials, and technique.

Keywords: root canal impediments; root canal retreatment; coronal disassembly

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INTRODUCTION

Generally, root canal treatment has a very high success rate, which is around 86-98%. However, root canal treatment can fail due to several causes, which are: bacterial persistence, calcifications resulting in inadequate shaping, cleaning, and sealing, overextended root canal sealing, missing canals, poor coronal restoration, and iatrogenic errors.^{1,2}

A failed root canal treatment can be managed by performing root canal retreatment. Root canal retreatment has a high success rate of 81%. If root canal retreatment fails, endodontic surgery still can be performed to manage the failure.^{2,3}

CASE

A 65 years old female patient came to Universitas Airlangga Dental Hospital which a chief complaint of painful tooth number 34 and 35. Tooth number 34 had an old composite restoration with a secondary decay, tooth number 35 had a PFM crown with a secondary decay. Both teeth were non vital. Both were tender on percussion and bite test. Surrounding soft tissue was normal. Radiograph image reveals inadequate root canal filling and calcified root canal

on both teeth. There was also a periapical lesion on tooth 35 apex (Figure 1a).

The diagnosis of tooth 34 was previously treated teeth with normal apical tissues. The diagnosis of tooth 35 was previously treated teeth with symptomatic apical periodontitis. Root canal retreatment with coronal restoration was proposed as the treatment plan and the patient agreed.

CASE MANAGEMENT

Tooth 34 in first visit was isolated with a rubber dam. Old resin composite filling was removed. The remaining tooth structure was plenty. The root canal filling material was removed with Protaper Universal SX and S1.

The remaining calcified root canal was negotiated with Mani D-Finder with the aid of 17% EDTA and 2.5% NaOCl. After several attempts, patency could be achieved. Working length was measured with Morita Root ZX apex locator and was confirmed with radiograph (Figure 1b). Glide path was established with K-File 15 and shaping was performed with Protaper Universal, using crown down pressureless technique. After shaping, the root canal was medicated with calcium hydroxide paste and then temporized.

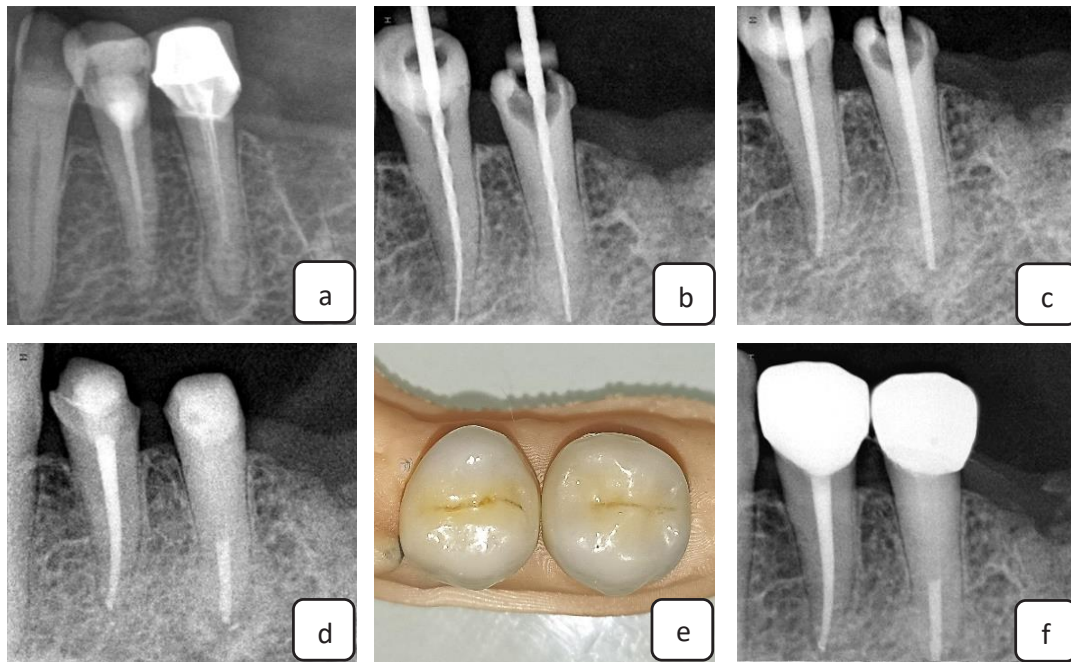


Figure 1. Radiograph image a) pre-op, b) working length confirmation, c) gutta percha trial, d) core build up, e) zirconia crowns, f) six month's control.

Tooth 35 in first visit was isolated with a rubber dam. Old PFM crown was removed. The remaining tooth structure was not plentiful. The root canal filling material was removed with Protaper Universal SX and S1.

The remaining calcified root canal was negotiated with Mani D-Finder with the aid of 17% EDTA and 2.5% NaOCl. After several attempts, patency could be achieved. Working length was measured with Morita Root ZX apex locator and was confirmed with radiograph (Figure 1b). Glide path was established with K-File 15 and shaping was performed with Protaper Universal, using crown down pressureless technique. After shaping, the root canal was medicated with calcium hydroxide paste and then temporized.

After 7 days in second visit, the patient returned and reported that the tooth was getting better. Both teeth were not tender on percussion and bite test. The temporary filling and calcium hydroxide paste were removed. Gutta percha cones were tried and a radiograph image was taken (Figure 1c). Both root canals were cleaned with 17% EDTA and 2.5% NaOCl. Endoactivator was used to activate the 2.5% NaOCl. Then, both root canals were dried with paper points. Lastly, both root canals were sealed with gutta percha and AH Plus sealer (Figure 1d).

Third visit, due to inadequate coronal tooth structure, fiber post was cemented into tooth number 35. Then, the missing tooth structure of tooth 34 and 35 was recovered with dual cure resin core-build up material. Both teeth were prepared for receiving zirconia full coverage crown (Figure 1e). The zirconia crowns were cemented in fourth visit.

Six months after completion of the treatment, the patient returned and she reported that tooth number 34 and 35 were in good condition (fifth visit). The patient expressed that she could chew comfortably (Figure 1f).

DISCUSSION

The most common cause of root canal treatment failure is persistent bacterial infection. Pathogenic bacteria reside inside the root canal system which is difficult for instruments and irrigants to reach.³ When a dentist encounters a case involving a failed root canal treatment, he/she has to make a careful decision either to perform root canal retreatment, endodontic surgery, or extraction.

Root canal retreatment is indicated when there is inadequate root canal treatment due to missing canals, calcification, ledge, or fractured instruments which lead to persistent infection.¹

Root canal retreatment involves removal of coronal restoration, inspection and evaluation of tooth restorability, removal of endodontic post and root filling material, and negotiation, shaping, cleaning, and sealing of the remaining root canal. A coronal restoration should follow root canal retreatment in order to recover the tooth form and function.³⁻⁵

Ideally, any coronal restoration should be removed before performing root canal retreatments. Total coronal disassembly has several advantages: enabling the operator to evaluate remaining tooth structure and improve visibility. However, there are some situations that a dentist might choose not to completely remove the coronal restoration but to access the root canal through the restoration instead. This scenario usually involves a prosthetic crown which was cemented recently.⁶

Root canal retreatment sometimes involves removal of endodontic post. Before commencing root canal retreatment, the dentist needs to make sure of the presence of the endodontic post and the material of the post. Different post

material can only be removed with a specific technique. For example, a metal post can be removed with ultrasonic vibrations. For fiber post, it is better to drill it to remove.⁷

The presence of root canal filling material needs to be carefully analyzed. The root canal can be either filled with a medicated paste, or silver point, or gutta percha. Gutta percha can be removed with rotary instruments, heat instruments, ultrasonic instruments, Hedstrom files, and solvents. For silver point removal, it takes a completely different approach to remove.⁸

Root canal negotiation can be carried out once coronal disassembly and removal of endodontic post and root canal filling material are successfully performed. An endodontic instrument which exhibits a high buckling resistance needs to be used to negotiate a calcified root canal. In this case, the operator used Mani D-Finder for the negotiation phase. Root canal irrigants such as 17%EDTA and 2.5%NaOCl can be used to aid in the negotiation phase. Those irrigants could help to condition the root canal; hence resulting in a less difficult root canal negotiation.⁹

An important determinant for a successful root canal retreatment is operator patience. Sometimes the negotiation of a calcified canal can only take a few minutes, sometimes it can take a lot of time. In this case, the negotiation of the calcified premolar root canal took approximately 40 minutes.

Final coronal restoration needs to be planned as early as in the diagnosis phase and after removing the old restoration, even though it is performed as the final phase of treatment.³ If the remaining tooth structure is adequate to support subsequent new coronal restoration, then the root canal retreatment can be continued. However, if the remaining tooth structure is not adequate, or if there are visible crack lines, then the dentist should discuss with the patient about

the situation and the possibility of changing the treatment plan. In conclusion, root canal retreatment on premolar with impediment can be successfully performed with appropriate instruments, materials, and technique.

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