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Non-Surgical Retreatment After Failed Intentional Replantation: A Case Report

Teng Kai ONG

ABSTRACT

A 27-year-old male patient complained of dental pain on previously root-treated tooth #17. Intentional replantation (IR) was performed. However, the symptoms returned at 10 months of follow-up, and a sinus tract was detected on the buccal gingiva of tooth #17. The patient refused extraction of the tooth and tooth was scheduled for non-surgical retreatment. Root canal retreatment was initiated with the removal of the previous root filling material while leaving the retrograde filling in situ. After 1 month of intracanal medication, the tooth became asymptomatic with complete healing of the sinus tract and the root canal filling was completed. Clinical and radiographic examination at 1 year follow-up revealed endodontic success with complete resolution of periapical radiolucency. This case report shows that non-surgical retreatment could be a viable alternative for failed IR.

Keywords: Intentional replantation, non-surgical retreatment, persistent periradicular radiolucency

HIGHLIGHTS

- Management of persistent periradicular periodontitis on an intentional replanted tooth is rarely reported, and extraction is often the treatment option that would be proposed to the patient.
- This case report shows periradicular healing after non-surgical retreatment on a failed intentional replanted tooth.
- Non-surgical retreatment could be considered as an alternative treatment for failed intentional replantation with careful case selection.

INTRODUCTION

Intentional replantation (IR) is a procedure by intentionally extracting a tooth atraumatically and replanting into the extracted socket after the root-end resection is performed extra-orally. It is often a treatment option when non-surgical retreatment and apicoectomy are difficult, not possible, or not indicated (1). Previously, IR was considered as the last resort to salvage a failed root-treated tooth (2). However, a meta-analysis study revealed that intentional replanted tooth presented 88% of mean survival (3); therefore, IR should be regarded as a potential option to rescue a failed root-treated tooth. However, intentional replanted tooth could result in certain complications, namely ankylosis, external root resorption, persistent periradicular infection, and periodontal breakdown (4). Under certain circumstances, extraction is unavoidable in a tooth with severe external root resorption, ankylosis, or with severe periodontal breakdown.

The purpose of this case report was to present a case with persistent signs and symptoms of periradicular infection after IR without evidence of external root resorption and ankylosis. This failed intentional replanted tooth was later successfully treated by non-surgical retreatment.

CASE PRESENTATION

A 27-year-old Asian male patient presented to an endodontic office with a complaint of dull aching pain on the upper right back tooth. The patient has no known medical illness and drug allergy. He allegedly fell 11 years ago and had his bilateral maxillary first and second premolars and molars fractured. Bilateral maxillary first and second premolars were extracted followed by implant placement by his previous dentist as the teeth were deemed unrestorable. Root canal treatment and

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From the Department of Surgical Science, (T.K.O. ✉ bryon.ong@gmail.com), Marquette University School of Dentistry, Milwaukee, Wisconsin, USA; (Private Practice, Tan Endodontic Dental Specialist Centre, Kuala Lumpur, Malaysia)

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crown placement were done on teeth #17, #16, #26, and #27. He started to experience dull aching pain on tooth #17 three months ago.

On clinical examination, tooth #17 presented with porcelain-fused metal crown and was tender on percussion and palpation. There was no swelling, sinus tract, or deep pocket detected around the tooth. Periapical (PA) radiograph (Fig. 1) showed previous root canal treatment with adequate length control on all three roots. A periradicular radiolucency involving all three roots was noted.

Tooth #17 was diagnosed as previously treated with symptomatic periradicular periodontitis. The patient presented with different treatment options, including non-surgical retreatment, IR, and extraction of the tooth. After discussing with the patient the risks and benefits, the procedure, the cost involved, and the prognosis of the aforementioned treatment options, the patient opted for IR. Informed consent was obtained from the patient.

During the IR procedure, tooth #17 was extracted atraumatically with forceps after local anesthesia was administered. After the tooth was extracted, all the roots were stained with methylene blue before it was examined under an operating microscope; no vertical root fracture was confirmed. Extra-oral apicoectomy was performed by resecting apical 3 mm of the roots with high speed handpiece, together with copious saline irrigation to avoid dehydration of the roots. After root-end resection, root-end preparation was performed with the use of diamond bur by removing apical 3 mm of the gutta percha before retrograde filling was placed with white mineral trioxide aggregate (ProRoot MTA; Dentsply Tulsa, Tulsa, OK, USA). Tooth #17 was then replanted into the socket. No splinting was prescribed as the stability of the tooth was achieved after replantation. The extra-oral time of this procedure was kept within 15 min. A PA radiograph (Fig. 2) was obtained showing the tooth was replanted to the original position and with acceptable retrograde filling. Postoperative instruction was given to the patient. Ibuprofen 400 mg was prescribed as pain medication, and the patient was instructed to take the medication whenever necessary.

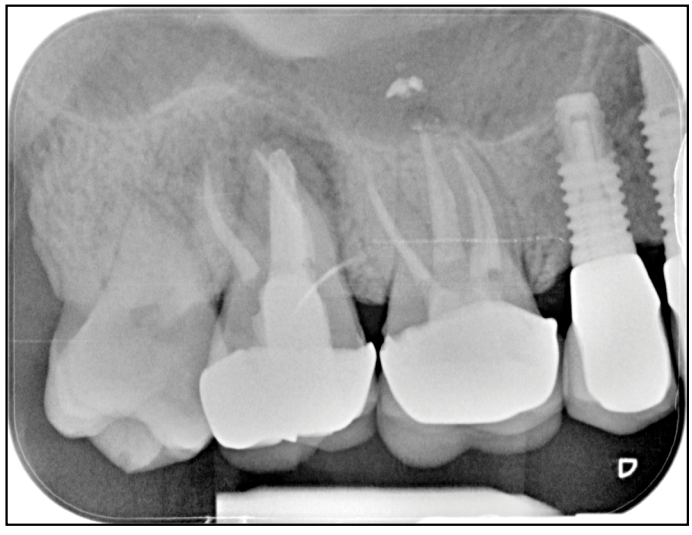

Figure 1. A preoperative PA radiograph showing a periradicular radiolucency associated to tooth #17 with previously treated canals

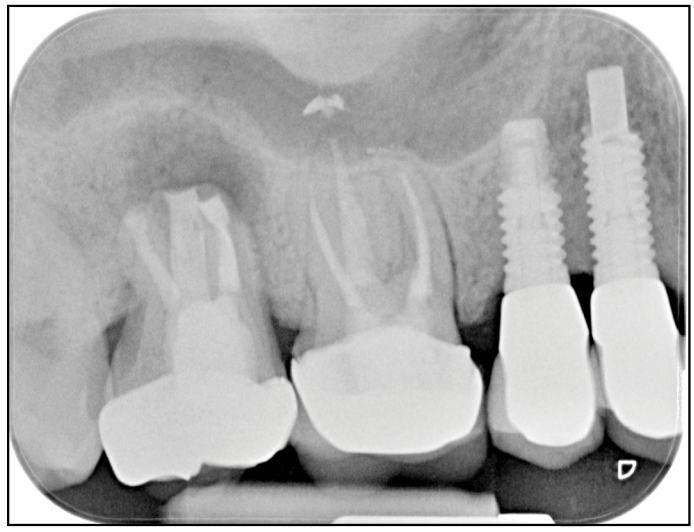

Figure 2. After IR, a PA radiograph was taken to confirm the tooth replanted into the original position and with good white MTA retrograde filling

Tooth #17 presented with grade 1 mobility at 1 week of follow-up, but the mobility of the tooth was within normal limit at 1 month and 3 months of follow-up. Moreover, the tooth was asymptomatic, and there was no swelling or sinus tract detected on the gingiva. However, the patient complained of intermittent discomfort on the tooth at 10 months of follow-up, and a "bump" was noted on the gingiva. On clinical examination, tooth #17 was tender on percussion, and a sinus tract was detected on the buccal gingiva. The sinus tract was traced with gutta percha prior to obtaining a PA radiograph (Fig. 3), and the gutta percha was traced with the sinus tract to the disto-buccal root. The size of PA radiolucency remained the same as compared with the PA radiograph taken immediately after IR. There was no sign of external root resorption and ankylosis

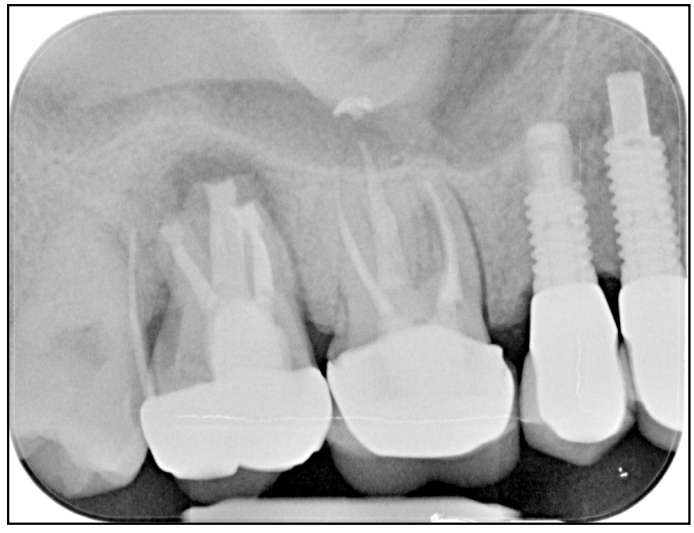

Figure 3. The patient presented with clinical signs and symptoms of chronic periradicular abscess at 10 months of follow-up. The radiograph showing a gutta percha traced the sinus tract on the buccal gingiva to the PA region of the disto-buccal root

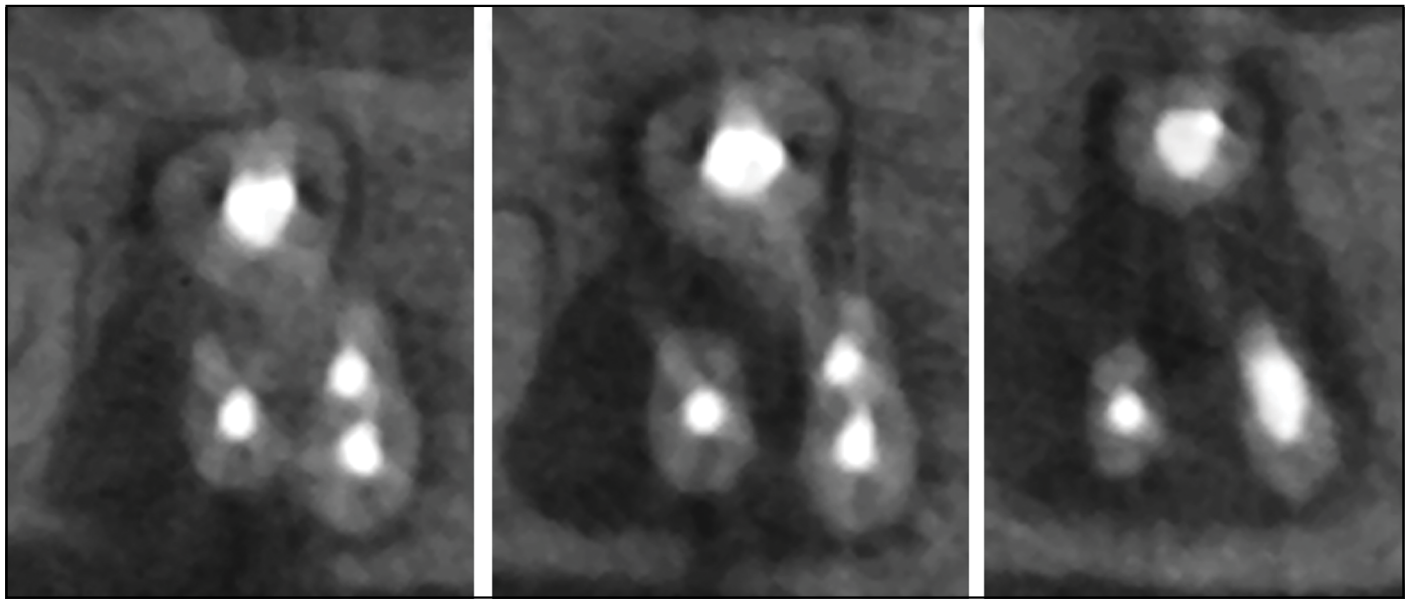

Figure 4. Axial view of CBCT images showing no sign of external root resorption and ankyloses. (a) Coronal third, (b) middle third, (c) apical third

detected, and this has been confirmed after the cone beam computed tomography (CBCT) (Fig. 4) was obtained. The patient was informed that the outcome of IR was unsuccessful, but as he refused extraction of tooth #17, a non-surgical retreatment was proposed. The patient consented to non-surgical retreatment on tooth #17 even though he understood the tooth presented with guarded prognosis.

Non-surgical retreatment was initiated under rubber dam after local anesthesia was administered. An operating microscope was used throughout the procedure. Access was done by drilling through the existing crown. Previous root filling material was removed by using ProTaper Universal Retreatment files (Dentsply Maillefer, Ballaigues, Switzerland) with the help of chloroform solvent until a hard root-end stop was felt, indicating MTA retrograde filling. Full instrumentation was done with Race file (FKG Dentaire, La Chaux-de-Fonds, Switzerland) until #40/04 on MB1, MB2, and DB canals and #60/04 on P canal, with leaving the MTA retrograde filling in situ (Fig. 5). All root canals were irrigated with 2.5% sodium hypochlorite, and XP-Endo Finisher R file (FKG Dentaire) was used to agitate and remove the remaining gutta percha that adhered on the root canal walls. This was followed by irrigating the canals with 17% ethylenediaminetetraacetic acid with agitation of the solutions with XP-Endo Finisher R file. The canals were finally rinsed by 2% chlorhexidine before the introduction of non-setting calcium hydroxide paste as intracanal medication. The tooth was temporized with glass ionomer-based restoration. After 1 month of intracanal medication dressing, the patient presented without any symptom, and the previous sinus tract disappeared. After local anesthesia was given and the rubber dam was placed, the root canals were irrigated with the solutions similar to the aforementioned sequence to remove the intracanal medication and to re-disinfect the root canals prior to obturation. After the canals were dried with paper points, obturation to the level of MTA retrograde filling was done with the use of iRoot SP (Innovative BioCeramix Inc., Vancouver, Canada) sealer and single cone gutta percha. The accessed

Figure 5. Radiograph taken after the removal of the root filling material. The MTA retrograde filling was left in situ

cavity was then restored with composite restoration. A final PA radiograph (Fig. 6) was obtained to confirmed good or adequate obturation.

The patient was asymptomatic and had no history of discomfort on tooth #17 at 1 year of follow-up. On clinical examination, tooth #17 was normal on percussion and palpation tests. There was no swelling, sinus tract, or deep pocket detected around tooth #17. The mobility of the tooth was within normal limit. PA radiograph (Fig. 7) was taken, and it showed complete resolution of the PA radiolucency, with bone filling in the previous radiolucent region. In addition, there was no sign of external root resorption and ankylosis. Therefore, the outcome of the treatment was deemed successful.

DISCUSSION

External root resorption and ankylosis are two common reasons of failure or complication of IR (4). According to the pre-

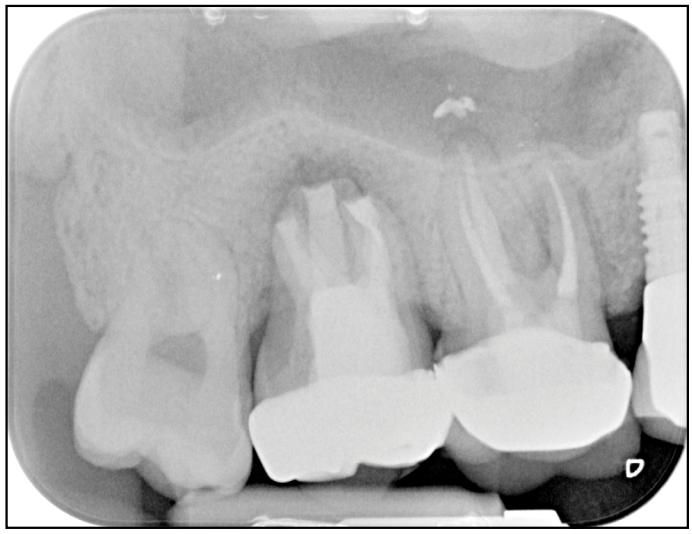

Figure 6. Radiograph taken immediately after non-surgical retreatment. A partial resolution of the PA radiolucency was observed

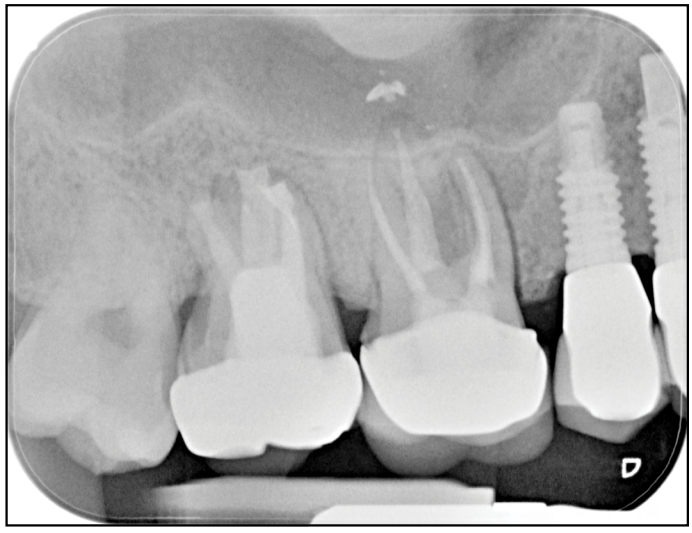

Figure 7. Radiograph taken at 1 year of follow-up showing no periradicular radiolucency on tooth #17. However, a periradicular radiolucency was detected on the mesio-buccal root of tooth #16

vious studies, extended extra-oral time and extensive trauma to the periodontal ligament of the tooth could increase the failure rate of replanted tooth (5-7). Therefore, atraumatic extraction of the tooth with extra-oral time within 15 min could increase the success rate of IR (6, 7). In this case report, the author followed the guidelines by atraumatically extracting the tooth and keeping the extra-oral time within 15 min; at the same time, the roots were constantly rinsed with saline to avoid desiccation of the roots. Moreover, prolonged and rigid tooth splinting may increase the risk of ankylosis (8). Therefore, it is important to allow a certain degree of physiological tooth movement to prevent ankylosis (9). In this case report, with preservation of the intra-radicular bony septum, initial stability of the replanted tooth was easily achieved; therefore, no splinting was needed. It was clearly indicated that there was no sign of ankylosis or external root resorption on the replanted tooth at 10 months of follow-up based on both PA radiograph (Fig. 3) and CBCT images (Fig. 4).

However, IR obviously failed as the patient presented with signs and symptoms of apical abscess at 10 months of follow-up. The use of MTA as retrograde filling has a long history of clinical success in endodontic microsurgery. However, Jang et al. showed that the use of MTA as retrograde filling for IR has a lower success rate than that of other materials (6). They explained that MTA took a longer time to set, and early contamination of the blood with MTA could potentially wash out the MTA before it was completely set. However, as observed in this case, there was no sign of MTA washout detected in the PA radiograph (Fig. 3). In addition, during the non-surgical retreatment, the MTA retrograde filling was clearly seen after the root filling material was removed, and it was found to set hard. Therefore, residual infection from the initial root canal treatment could be an explanation which had its pathway into the periapical tissues through lateral canals or potential gaps between MTA and root-end preparations.

Another study has shown lower success rate of IR on maxillary molar as compared with mandibular molar (10). The authors of the study speculated that gravity might influence negatively on the reattachment on the replanted tooth, which increased the mobility of the tooth and thus reduced the treatment outcome (10). Nevertheless, in this case report, the initial stability after replantation was good, and follow-up visits have shown that the mobility and the periodontal pocket of the tooth were within normal limit. Therefore, it does not appear that the location of the tooth nor the periodontal breakdown is responsible for the failure of the IR.

Non-surgical retreatment was offered to the patient as an alternative treatment as the patient refused to have the tooth extracted. However, to the author's knowledge, there was no case report or study presented on the success of non-surgical retreatment on failed IR; therefore, the prognosis of the treatment remained unknown. After the non-surgical retreatment, complete resolution of PA radiolucency was observed in the PA radiograph (Fig. 7) at 1 year of follow-up. Therefore, the non-surgical retreatment is considered successful. It is obvious that further mechanical instrumentation and irrigation of the root canals have eradicated residual infection in the root canal and possibly lateral canals. According to Kim et al., by removing the apical 3 mm of the root tip through apicoectomy, 93% of the lateral canal was removed (11). In other words, 7% of the lateral canal could be left untreated, if any. Therefore, with the non-surgical retreatment, the intraradicular infection was being controlled by biomechanical instrumentation and disinfection; this leads to the healing of the periradicular lesion.

Many studies discussed the success or survival of IR but rarely discussed the management of the failed IR. This is especially in persistent periradicular infection after IR, as most studies place the blame on the quality of retrograde filling, but did not offer a solution (2, 6). However, the possibility of intraradicular infection that leaked through the lateral canal(s) should not be neglected. If that is the case, a non-surgical retreatment on a failed IR might have a good chance of endodontic success. Therefore, extraction of the failed IR is only wise after the full understanding of the reason(s) of the failure of IR.

CONCLUSION

Non-surgical retreatment could be a viable option for failed IR. Further studies are needed to evaluate the long-term prognosis of this treatment option.

Disclosures

Informed consent: Patient's written informed consent was obtained.

Conflict of interest: The author declares no conflict of interest.

Ethics Committee Approval: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from the patient for being included in the study.

Peer-review: Externally peer-reviewed.

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