



Overfill Resolution Through Non-Surgical Endodontic Treatment: A Case Report

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Continuous improvement and technological progress in the field of microscopic endodontics enable a gradual increase in indications for non-surgical root canal treatment. While most publications report successful surgical management of overfill or extruded foreign bodies into the periapical area, very few report that this complication can be successfully managed with non-surgical endodontic treatment. This case report presents successful management of a lower left second molar (tooth #37) diagnosed with exacerbated chronic apical periodontitis and massive overfill in a 36-year-old patient WITH non-surgical endodontic treatment AND bent H-file to remove extruded material under dental operating microscope control. It discusses technical aspects of this procedure, as well as its possible complications, including a sodium hypochlorite accident.

Keywords: Overfill; Endodontic Treatment; Endodontics; Non-surgical Treatment; Obturation Material Removal

Introduction

Continuous improvement of antiseptic non-surgical endodontic treatment protocols and technological progress in the field of microscopic endodontics enables a gradual increase in indications for non-surgical root canal treatment (RCT) and effective management of even extensive periapical lesions, which translates into preservation of a higher number of patients' own teeth [1, 2]. While most publications report successful surgical management of overfill or extruded foreign bodies as a complication of endodontic treatment [3, 4], there are very few published case reports showing that this complication can be successfully managed with non-surgical endodontic treatment [5], especially when it comes to massive overfill.

This case report presents successful management of overfill with chronic apical periodontitis lesion in lower left second molar with non-surgical RCT and discusses technical aspects of this procedure, as well as its possible complications.

Case Presentation

A 36-year-old female patient was referred to dental clinic due to exacerbated chronic apical periodontitis of tooth #37. The main

clinical symptom was spontaneous pain of tooth #37. The tooth was sensitive to percussion. Patient medical history showed no systemic diseases. Teeth #36 and #37 underwent RCT 3 months prior to the admission. Periapical radiograph (RVG) revealed chronic apical periodontitis in both teeth, underfilled canals in tooth #36 and massive overfill in tooth #37, with overextension of gutta-percha (GP) cone into the periapical area of tooth #37 and poor condensation of obturating material (Figure 1A). Patient was referred for extraction of tooth #37; however, a decision of performing non-surgical endodontic retreatment with retrieval of overextended material from beyond the apex through root canal was made. Patient signed informed consent. Infiltration anesthesia was performed with 1 ampule of 4% articaine with 1:200 epinephrine Septanest (Septodont, Saint-Maur-des-Fosses, France). Tooth #37 was isolated with Hygienic Dental Dam Kit rubber dam (Coltene/Whaledent, Altstätten, Switzerland). Dental operating microscope Leica M320 (Leica Microsystems, Wetzlar, Germany) was used throughout the entire endodontic treatment procedure. Obturating material (GP with sealer) was removed from canals with ultrasonic K-file (VDW, Munich, Germany), mounted on a 120° endo-chuck on endo mode with UDS-P LED scaler (Woodpecker, Guilin, Guangxi, China). Mechanical preparation was started with ISO 10 C-pilots



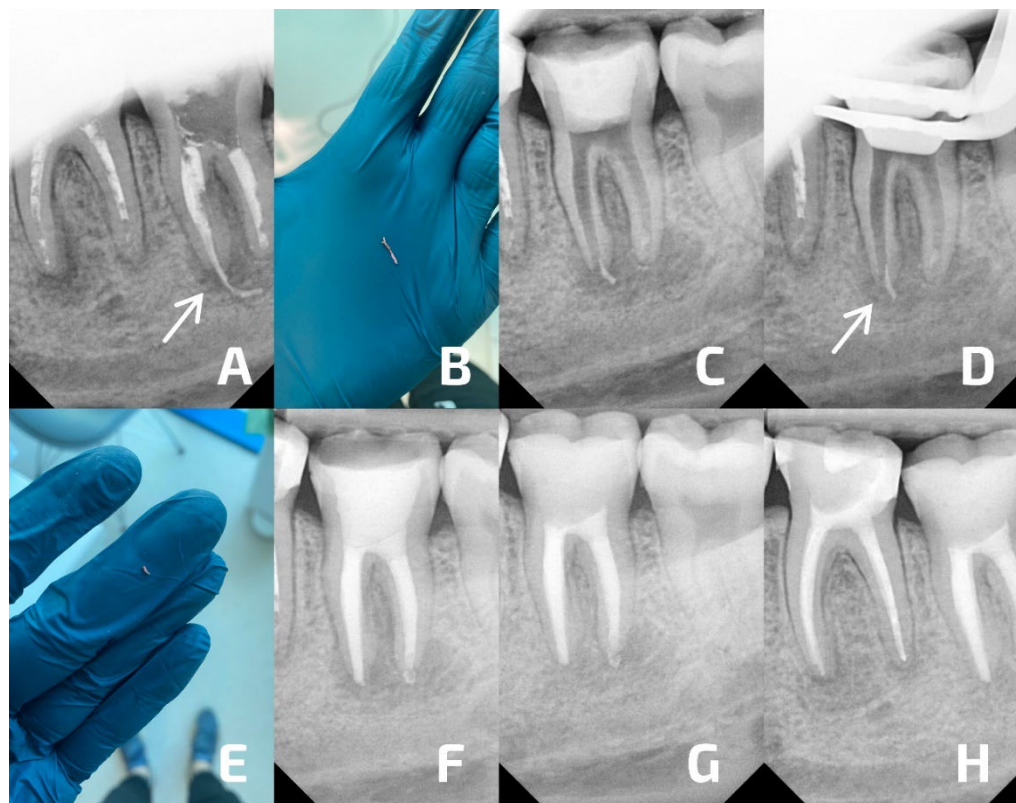


Figure 1. A) Pre-operative radiograph of teeth #36 and #37; B) Overextended material removed from apical area; C) Radiograph after first visit revealed a small part of GP cone left in the apical area; D) Intra-operative radiograph; E) Last part of GP cone removed from beyond the apex; F) Post-operative radiograph; G) One-year follow-up-complete healing of lesion in apical area; H) Apical periodontitis healed after retreatment of tooth #36

(VDW, Munich, Germany) with working length assessment by Raypex 6 electronic apex locator (VDW, Munich, Germany). Glide path was prepared with ISO 15/0.02 and 20/0.02 hand H-files (VDW, Munich, Germany), followed by chemo-mechanical preparation with Endostar E3 rotary instruments (PolDent, Warsaw, Poland) and crown-down technique up to ISO size 30/0.04, followed by MTtwo rotary files (VDW, Munich, Germany) ISO 35/0.04, 40/0.04, and 45/0.04 as a master apical file in distal canal. Overextended GP cone of mesio-lingual canal was removed from beyond the apex with a 31-mm 20/0.02 H-file 90° bent at the tip (VDW, Munich, Germany) (Figure 1B). All canals were copiously irrigated with 5.25% sodium hypochlorite Chloraxid (Cerkamed, Stalowa Wola, Poland) throughout mechanical preparation. The tooth was filled with a temporary glass ionomer filling (Fuji IX, GC, Tokyo, Japan), and a radiograph was taken after the first visit (Figure 1C). During the second appointment, another attempt was made to remove the overextended GP cone, with the same technique. Intra-operative radiograph was taken (Figure 1D), as the operator was unsure of the complete removal of overfilled material due to bleeding from the apical area. The gutta-percha cone was finally removed beyond the apex (Figure 1E). Master

apical file was established as 60/0.04 in mesio-lingual canal and 40/0.04 in mesio-buccal canal. Final irrigation protocol was performed in all canals: 5.25% sodium hypochlorite with passive ultrasonic irrigation (PUI) method, 40% citric acid with passive ultrasonic irrigation for smear layer removal, and final flush with 2% chlorhexidine for better antimicrobial effect with manual dynamic irrigation. Canals were dried with sterile paper points (MetaBiomed, Cheongju-si, Republic of Korea), and all apices were closed with 4 mm mineral trioxide aggregate (MTA) plugs of BioMTA (Cerkamed, Stalowa Wola, Poland), followed by GP with AH-Plus sealer (Dentsply Sirona, Charlotte, NC, USA). The orifices were sealed with blue color flow (Cerkamed, Stalowa Wola, Poland), and the cavity was filled with Estelite Asteria composite (Tokuyama Dental, Tokyo, Japan). A post-operative radiograph was taken (Figure 1F). The prognosis of treated teeth was assessed as good, as the patient's regenerative potential was not compromised by any systemic disease, and hard tissues of the crown of #37 were largely saved. One-year follow-up radiograph showed complete healing of apical periodontitis (Figure 1G). Endodontic retreatment was also performed in tooth #36, with the result seen in Figure 1H.

Discussion

Overfill is one of many complications that can occur during non-surgical RCT [6]. Although in some cases, overfill may not influence the treatment outcome [7], it has been proven that overextension of obturating material is irritating and damaging to periapical tissues, causes an inflammatory response, and may compromise bone repair [8]. Thus, if possible, foreign bodies should be retrieved from the apical area. It is possible to remove overextended material during non-surgical RCT; however, those procedures should be considered as high-risk in terms of sodium hypochlorite accident occurrence [9]. Aseptics, which is a key factor to be preserved in any case of RCT, plays a crucial role in the discussed procedure, as the operator must not insert any non-sterile instrument, solution, or material into the periapical area. Massive overextension of obturating material beyond the apex implies that apical constriction has not been preserved, and the root apex was over-prepared. In these cases, the root canal must be closed with an MTA plug with a minimum thickness of 4 mm [10, 11] to preserve effective sealing in the apical area and secure a successful outcome of RCT.

Conclusion

Overfill can be successfully managed with non-surgical RCT with the aid of a dental operating microscope, and retrieval of the foreign body from beyond the apex is possible through root canal access. This procedure, however, is technically demanding and should be considered high risk in the aspect of sodium hypochlorite accident occurrence and therefore should be performed only by experienced practitioners. The tooth survival rate following non-surgical RCT is proven to be high [12] and this case report contributes to expanding indications for this non-invasive method of endodontic treatment.

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Conflict of interest

None.

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Authors' contributions

BC is the sole author and is solely responsible for all aspects of the study, including conception, data collection, analysis, and manuscript preparation.

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