

## CASE REPORT

# Nonsurgical Retreatment of Lower Incisor with Apical Lesion

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## ABSTRACT

Orthograde retreatment is the first choice to manage an endodontic failure, because surgical approach not always eliminates from the root canal all those microorganisms that caused the failure. Endodontic surgery is commonly performed, when the root canal space is no longer accessible as a result of the presence coronal obstacles. But this case report demonstrates that the attempt to removal of prosthetic crown and post allows to create the right access and then to perform an adequate shaping, cleansing and sealing of the root canal system, even if the chronic periapical pathology induced an initial apical resorption. When the apical diameter is increased, perfect obturation with gutta-percha is not possible, and the apical sealing can be managed with mineral trioxide aggregate (MTA). Follow-up intraoral periapical radiograph at 20 months shows adequate repair of the periapical rarefaction.

**Keywords:** Endodontics, Retreatment, Mineral trioxide aggregate.

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## INTRODUCTION

Successful root canal treatment is based on cleansing, shaping and sealing the root canal system.<sup>1</sup> The main objective of root canal therapy is the elimination of microorganisms from the root canal system and the prevention of recontamination after treatment.<sup>2,3</sup> Although, initial root canal therapy has been shown to be a predictable procedure with a high degree of success, failures can occur after treatment.<sup>4</sup> The inability to eliminate microorganisms that was present at the time of

initial treatment or their reintroduction into the root canal system may conduce to failure of root canal therapy.<sup>5</sup> The reasons microorganisms persists in the endodontic space after initial treatment are the failure to detect or to treat all of the present root canal system and/or the inadequate cleansing, shaping and sealing of root canal system.<sup>6,7</sup>

If nonhealing occurs the first treatment option is nonsurgical retreatment.<sup>1</sup> Retreatment procedures can be expedited, if the coronal restorations are removed. When a tooth has previously been restored with a full coverage crown, the crown should be removed to guarantee a favorable access.<sup>1</sup> Many retreatments require removal of posts and core. When the removal of posts is impossible or their removal would result in further damage to the root structure, the surgical approach is the best indication. The surgical retreatment approach should only be the first choice, if there are obstructions within the root canal system that make the nonsurgical treatment impossible.<sup>1</sup> But nonsurgical therapy or revision (if possible) before surgery improves the surgical success rate.<sup>8</sup>

This case report describes a borderline case, referred for apical surgery and treated just with orthograde approach.

## CASE REPORT

A 39-year-old female was referred by a general practitioner not skilled in endodontics for surgical treatment of first right mandibular incisor with prosthetic crown (Fig. 1).



**Fig. 1:** Clinical view

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Patient gave the history of trauma, endodontic treatment and prosthetic rehabilitation in relation to the incisor many years back. Actually, the tooth is free of symptoms, with no pain, periodontitis and swelling. She asked the colleague to replace the ceramic crown for esthetical reasons, so her dentist preferred to program the periapical surgery before starting prosthetic rehabilitation.

On radiographic examination, the incisor showed the presence of a large-diameter metallic post into the root canal, not complete obturation of the apical portion and a large periapical pathology (Fig. 2).

Based on clinical and radiographic examination, non-surgical endodontic retreatment was planned, just as an attempt to create the ideal conditions for surgery. No sensitivity or pain is present at percussion and palpation, with absence of swelling or of a draining sinus tract, no recurrent caries is present, the radiograph reveals the presence of untreated and poorly obturated apical portion of canal. The large metal post seems to be the only limit in accessing the root canal.

After informing the patient about the related risks, she accepted the retreatment procedures. With a diamond bur mounted on high-speed handpiece, the old ceramic crown was cut and removed and the cast metallic post was revealed (Fig. 3).

With the apposite ETPR tip (Satelec Acteon, Merignac, France) mounted on ultrasonic device the post was gently removed (Fig. 4) and the root canal was accessible (Fig. 5). Under microscope magnification (Leica M320, Leica Microsystems, Wetzlar, Germany) the root canal retreatment started. The access was refined with the SF70 sonic tip (Komet Brasseler, Lemgo, Germany) (Fig. 6). The apical portion was easily scouted with a stainless steel n. 10 K file (Fig. 7), so after working length determination, the root canal was shaped with the OneShape single-file NiTi system (MicroMega, Besancon, France), under irrigation with 5% NaOCl and 17% EDTA solutions (Fig. 8). Final rinse was obtained with 5% NaOCl activated with the SF65 sonic NiTi tip (Komet Brasseler, Lemgo, Germany). During canal shaping, a significant resorption of apex was detected and the apex showed a large diameter (Fig. 9).

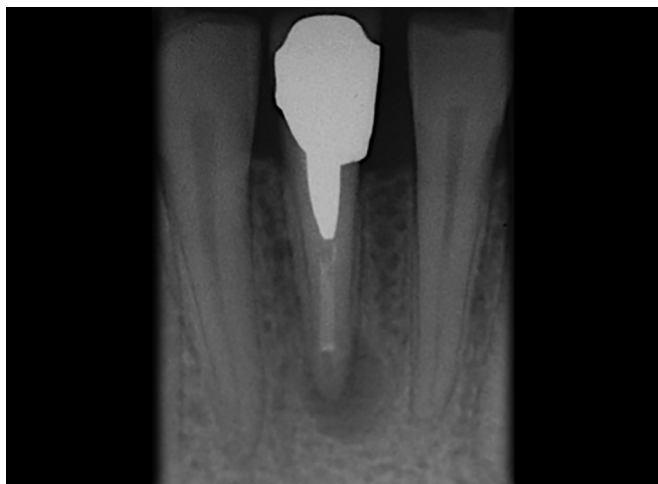


Fig. 2: Preoperative radiograph



Fig. 3: Tooth after removal of the prosthetic crown

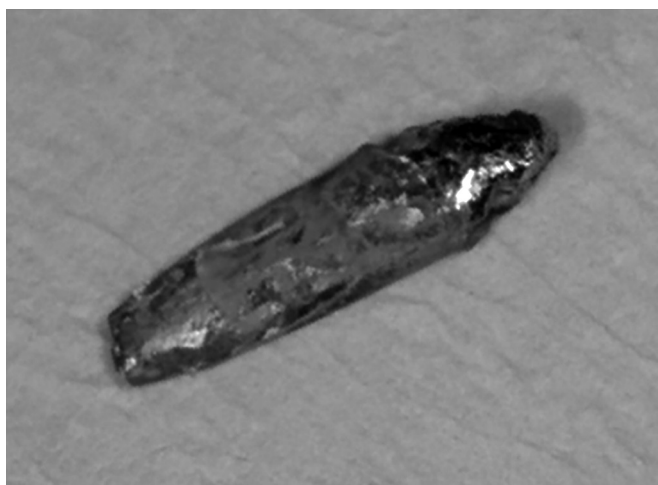
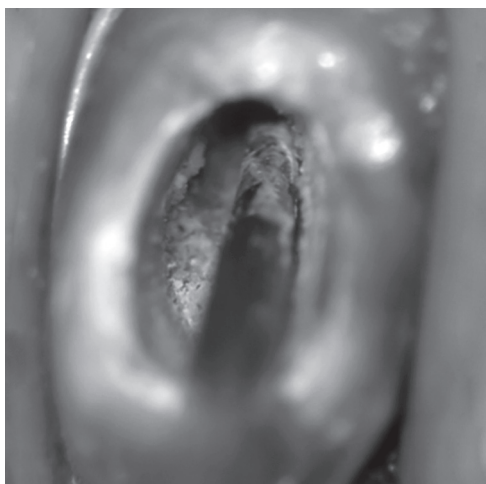


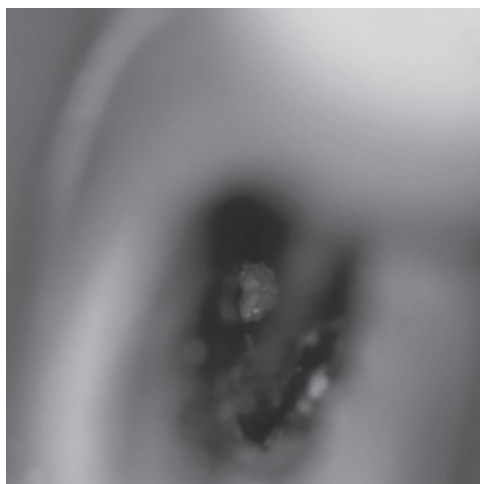
Fig. 4: Cast metallic post removed



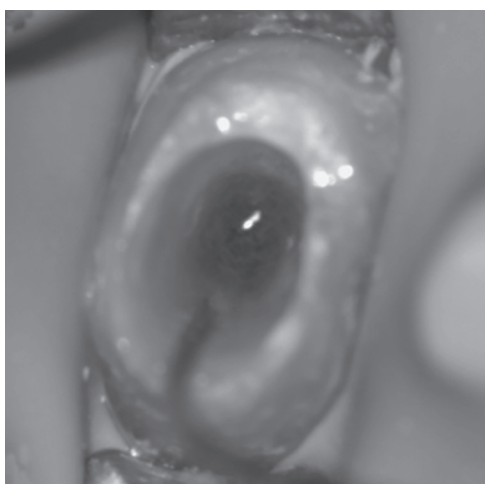
Fig. 5: Access cavity after removal of the post



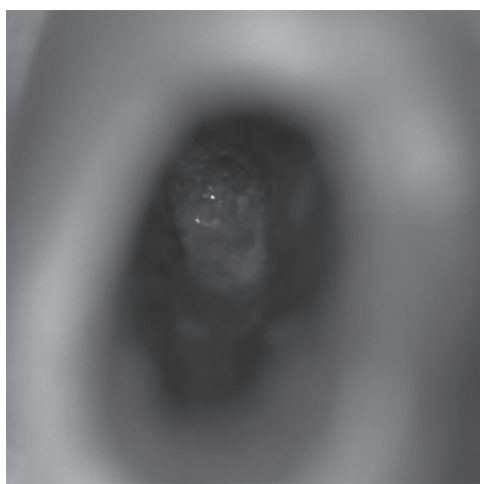
**Fig. 6:** Finishing of access cavity with sonic tip



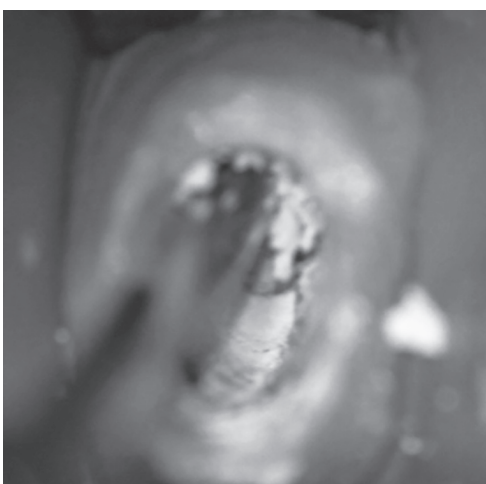
**Fig. 7:** Canal scouting with n.10 K file



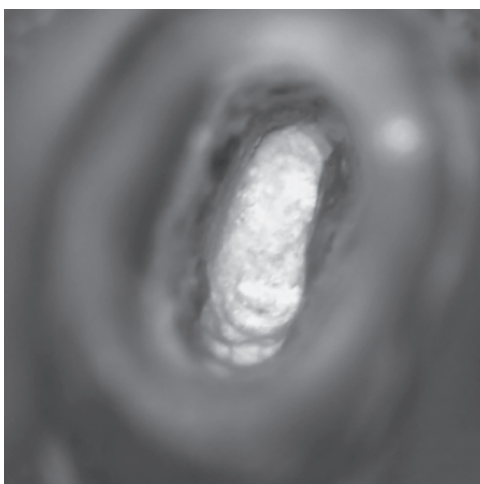
**Fig. 8:** Irrigation



**Fig. 9:** Enlarged apical foramen (20x magnification)



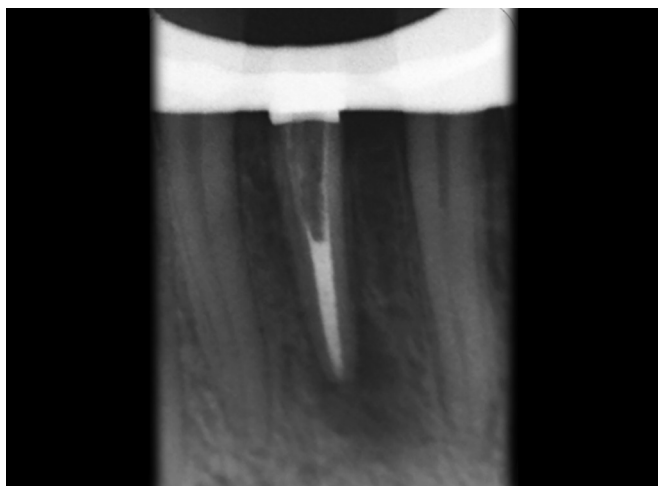
**Fig. 10:** Extrusion of MTA



**Fig. 11:** MTA after compaction

The apical enlargement made impossible the obturation with gutta-percha, so the apical seal was obtained with the placement of mineral trioxide aggregate (Pro Root MTA, Dentsply Tulsa Dental, Tulsa OK). The material was placed with a micro syringe (Fig. 10) and compacted in the apical portion of the canal (Fig. 11) and then a wet cotton pellet

was placed against the MTA and left until the next visit. An intraoperative radiograph was made to control the correct placement of MTA (Fig. 12). In the next visit, after a week, the MTA was fully set and the tooth was ready to complete the obturation (Fig. 13). But no gutta-percha was placed, because all residual space was necessary for a new post.



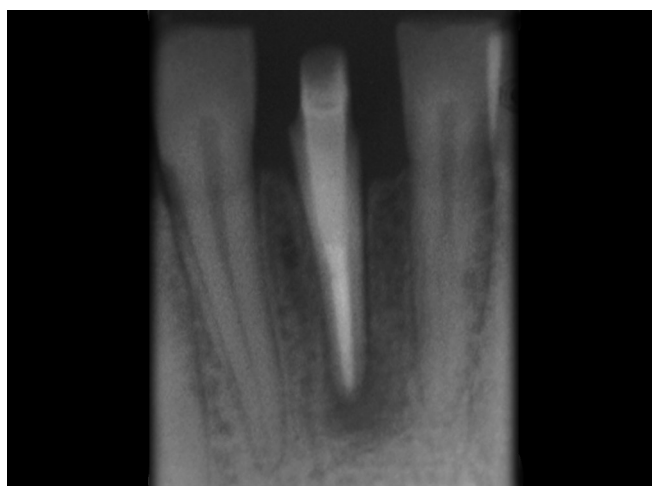
**Fig. 12:** Intraoperative radiographic control



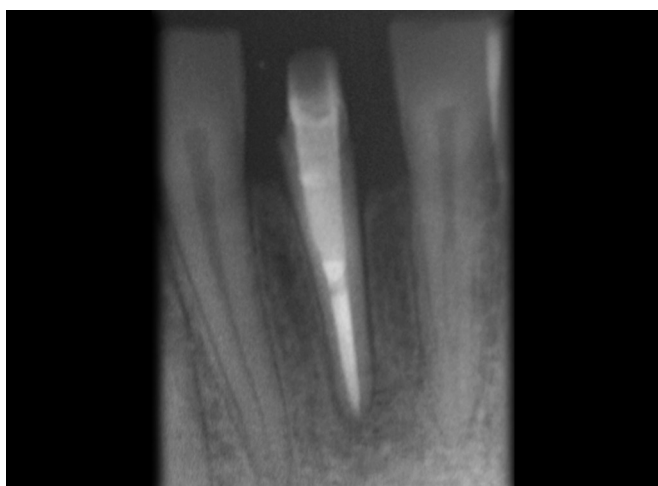
**Fig. 13:** Radiograph after a week



**Fig. 14:** Glass fiber post



**Fig. 15:** Radiographic control after fiber post cementation and build-up



**Fig. 16:** Control after 3 months



**Fig. 17:** Final prosthetic restoration

Residual dentinal walls were thin, so an adhesive fiber post was selected for restoration (Fig. 14) and a radiograph was taken as control (Fig. 15). A temporary resin crown was applied and left for 3 months, in order to monitor the clinical conditions of the incisor and to evaluate if periapical surgery was really necessary. Radiographic control after 3 months

showed the significant reduction of periapical radiolucency (Fig. 16). So, prosthetic restoration was completed with a lithium-disilicate ceramic metal-free crown (Fig. 17).

Radiographic control after 14 months (Fig. 18) confirmed that orthograde endodontic retreatment was successful and no surgery was requested.



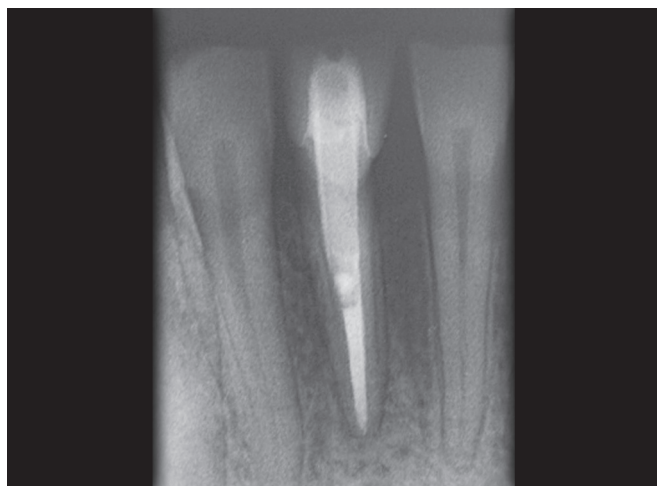


Fig. 18: Control after 14 months

## DISCUSSION

Nonsurgical root canal therapy is a highly successful procedure, if diagnosis and technical aspects are carefully performed.<sup>1</sup> There is a common belief that if root canal therapy fails, surgery is indicated for correction. Most failures are best corrected by retreatment. Studies have shown that more than two-thirds of retreated cases are successful after retreatment of the original root canal therapy.<sup>5,9</sup> There are, however, situations in which surgery is necessary to retain a tooth that would otherwise be extracted.<sup>1</sup> The retreatment option affords the practitioner, 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. When all obstruction within the root canal system can be removed from, nonsurgical treatment becomes the ideal choice.

In this case, a complex retreatment was performed, because the chronic periapical pathology induced an initial apical resorption, with an increased apical diameter. A major problem in performing endodontics in teeth with wide open apices is obtaining an optimal seal of the root-canal system. The aim of the procedure is to limit bacterial infection and create an environment conducive to the production of mineralized tissue in the apical region.<sup>10,11</sup> Mineral trioxide aggregate has been proposed as a potential material to create an apical plug at the end of the root-canal system, thus preventing the extrusion of filling materials.<sup>12</sup> Mineral trioxide aggregate possesses good sealing ability, good marginal adaptation, a high degree of biocompatibility and a reasonable setting time (about 4 hours). The operative microscopy allows one to see directly to the end of the root-

canal system directly allowing for a good chance for accurate placement of the material.

An adequate disinfection of the entire root-canal system and the application of MTA at the apical resorption site under microscopy view precluded, in this case, the need for surgical intervention. Mineral trioxide aggregate provided good sealing of the apex and no more obturation with gutta-percha was necessary, with the aim to leave the majority of dentin surface free for fiber post adhesion.

## CONCLUSION

Orthograde endodontic retreatment is always the first choice, if possible. Success rate is high and in all cases which apical surgery is not necessary the satisfaction of patients is great.

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