

Surgical Endodontic Management Of Maxillary Incisors: A Case Report

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Abstract:

In the root canal system, infection of the pulp tissue caused by caries or other pathways is the primary cause of apical periodontitis. The ultimate goal of the endodontic treatment is to create adequate conditions for periradicular tissue healing. Nonsurgical endodontic treatment is a highly predictable treatment option in most cases, but surgery may be indicated for teeth with persistent periradicular pathosis unresponsive to nonsurgical approaches. The aim of this article is to highlight the possibility of the successful outcome of surgical endodontic treatment following failed non-surgical treatment of right maxillary central incisor. With proper case selection and operator skill, periradicular surgery can be considered predictable, cost-effective alternative to tooth extraction and tooth replacement.

Keywords: *retreatment, apicoectomy, endodontic surgery, mineral trioxide aggregate*

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I. Introduction

Conventional endodontic treatment aims to eliminate bacteria from the root canal system and establish effective barriers against root recontamination.¹ To achieve success, cleaning, shaping, and filling of the entire root canal system are considered essential steps in endodontic therapy. Failure factors in conventional root canal treatment are frequently related to the presence of residual bacteria (persistent infection) or re-infection in a previously disinfected canal.²

Endodontic surgery comprehends a set of procedures recommended in periapical diseases treatment when conventional endodontic therapy does not obtain favourable outcomes. Indications for periapical surgery are: root canal obliteration impeding endodontic instrumentation access to the apical region; endodontic material apical extrusion impeding radiolucent lesions repair and/or causing clinical symptoms; unsuccessful endodontic treatment and retreatment impossibility due to prosthesis; root perforation impeding root canal hermetic sealing. The goal of periradicular surgery is the removal of lesion and sealing of apical third root dentine, which allows soft and hard tissue regeneration.^{3,4}

Historically, this operation was reported 4500 years ago in the form of simple cortical trephination. Around the 11th Century AD, Abulcasis, an Arabian physician described the first case of apicoectomy in his medical encyclopedia, *Altasrif*.⁵ A root-end resection procedure to manage a tooth with necrotic pulp and the alveolar abscess was documented in 1871,⁶ and root end resection with retrograde cavity preparation and filling with amalgam was documented in 1890's.⁷

Endodontic surgery is a popular procedure that increases many teeth's retention survival percentage when endodontic treatment alone is insufficient.⁸ The treatment success is qualified by major factors including the correct indication, the correct technique, the follow-up and the patient's observance of the post-surgery recommendations. The treatment outcome of apical surgery needs periodic clinical and radiographic assessment.

This paper presents a case report of the surgical removal of a periapical pathology due to failure of conventional endodontic treatment, and the persistence of periapical pathology.

II. Case Report

A 30 years old female patient reported to the Department of Conservative Dentistry & Endodontics, with the chief complaint of pain, recurrent swelling, and pus discharge from the upper right front tooth region of the

jaw. Patient notified a history of child hood trauma to upper front tooth region and had undergone root canal treatment of upper front teeth 20 years back.

Clinical examination revealed, that tooth # 11,12 was tender to percussion and palpation, also there was presence of pus discharge from the sinus tract near the root tip of 11 and grade 1 mobility for 11 and 12. Tooth # 11, 21 had a metal-ceramic crown. Radiographic examination revealed well-defined periapical radiolucency around root apex of 11 and 12 along with inadequate endodontic therapy of 11. Tooth #12 was also root canal treated. (Fig 1a) A vitality test of 12 was done with an electric pulp tester and cold test did not show any response. Based on clinical and radiographic examination, the case was diagnosed as a chronic periapical abscess. Information regarding the treatment plan, along with complications was given to patient. Root canal treatment of 12, retreatment of 11 through metal ceramic crown followed by surgical approach with retrograde restoration was planned.

Under rubber dam isolation, retreatment of 11 was initiated. Access opening was re-entered with trans-metal bur through metal ceramic crown. The gutta-percha in the coronal third was removed with Gates Glidden (GG) drills #2 (Mani, Tochigi, Japan), while in the middle and apical third, gutta-percha was first softened with chloroform solvent, then removed with size #25 Hedstrom file (Mani, Tochigi, Japan). Working length was established.

Access cavity of 12 was prepared with endo access bur #2 (Densply, Maillefer, Switzerland). Working length was determined using an apex locator (Canal pro, Coltene, USA) and reconfirmed with radiographs. Biomechanical preparation of the canals were performed with hand instrumentation (Mani, Tochigi Ken, Japan) [passive step-back technique] and the root canal spaces were irrigated with 15 mL of 3% sodium hypochlorite (Percan, Septodont, India) and 17% EDTA, alternatively. Calcium hydroxide paste (Metapex, Metabiomed, S Korea) was used as an inter-appointment medicament and the access cavity was temporized with Zinc Oxide Eugenol (ZnOE) cement.

Patient was asked to visit after 10 days. Intracanal medicament was removed. Final irrigation was carried out with 2% chlorhexidine (Asep-RC, Anabond, India). Obturation was completed with gutta-percha (Densply, Maillefer Switzerland) and AH plus sealer (Dentsply, Konstanz, German) using the lateral compaction technique. (Fig 1b)

Surgical Intervention was done on next day of obturation. Prior to surgery, hematological investigations were carried out and the patient signed written consent. After mouth preparation with povidone iodine rinse and swab, local anesthesia (2% lidocaine with 1: 100,000 epinephrine) was administered. Using 15c blade and bard parker handle, a sharp incision was made deep into bone. A sulcular incision in addition to two vertical releasing incisions were given, and a full- thickness mucoperiosteal flap was raised.⁹ After elevating the flap and inspecting, a breach in the cortical bone was located. (Fig 2a) A round carbide bur under constant irrigation for cooling was used to enlarge bony defect to the buccal window to gain access to the periapical lesion and root end of the tooth with defect. then used to remove the soft granulation tissue. Apical end of 3mm was resected at an acute angle of 10 degree in facio lingual direction to the long axis of tooth with a tapered fissure bur in high-speed handpiece, under constant irrigation. The cavity was with MTA once it was isolated thoroughly. Adaptation of filling material was confirmed by using radiograph.

The bony cavity was thoroughly irrigated. The flap was repositioned and sutured. (Fig 2b) Postoperative medications and instructions were given to the patient. After 7 days, post-operative, the suture was removed. (Fig 3a) The patient was then recalled at 3 months-6 months to assess the clinical and radiographic signs of healing. (Fig 4a, 4b)

After 6 months follow up, there was absence of significant sign and symptoms clinically. Radiograph showed reduced lesion size with new bone formation at periapical area.

III. Discussion

Endodontic surgery is a procedure which consists of the removal of pathological periapical tissue, thus, reaching the goal of creating the best conditions to the tissue health, regeneration and creation of new tooth structural support. When performed for the first time, endodontic surgery has a success rate of between 78 and 91%⁸ but is less successful in retreatment situations where there is a periapical lesion.¹⁰

The major cause of periapical lesion is a leaky apical seal with egress of microorganisms and their toxins. Removal of the diseased periapical tissue by periradicular curettage eliminates only the effect of the leakage, not the cause. Thus, the elimination of periradicular lesion alone will likely result in the recurrence of the lesion if the root end is not resected. Root-end amputation of about 3mm removes all of the lateral canals and apical ramifications, therefore, posing less risk of reinfection and eventual failure.

Due to its perfect characteristics, MTA was selected in this instance over other materials as a retrograde filling material. The capacity to boost the root strength of fragile plants, simple and moisture-free application, good seal, and biocompatibility were all important features. Additionally, over a longer period of time, fresh

cementum was discovered on the material's surface.¹¹ MTA as the root-end filling material produced a high success rate in two-year follow-up research.¹²

Bacterial infection is nearly always the primary cause of endodontic failures. Finding the source of the ongoing infection is the first step in managing a failing root canal filling.¹³ As a result, orthograde retreatment may be the preferred course of treatment. The bacteria may be located within a previously missing or uninstrumented part of a root canal, penetrating via a leaky coronal repair and root filling.

This case describes how, after 6 months of follow-up, teeth with extensive periapical lesions and recurrent complaints might be treated with periapical surgery using MTA.



Fig 1a- Preoperative Radiograph
Fig 1b-Obturation Of 12 And 11



Fig 2a- Flap Reflection Showing Bone Defect
Fig 2b-Immediate Postop With Sinus Tract



Fig 3a- 7 Days Postoperative Showing Healing Of Sinus Tract
Fig 3b- 6 Months Postoperative

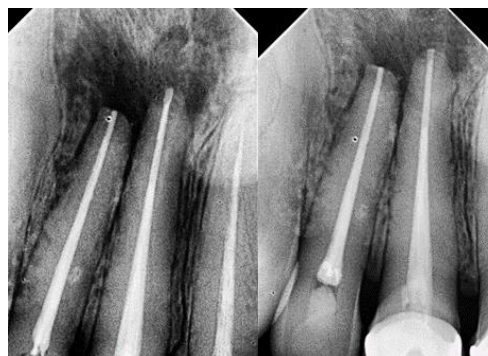


Fig. 4a- Radiograph After 3 Months
Fig. 4b- Radiograph After 6 Months

IV. Conclusion

When traditional endodontic therapy is found to be ineffective, the dentist must take alternative therapies into account. Nonsurgical retreatment is not an option for all failures. Clinicians must balance risk and reward and understand that, on occasion, a patient may benefit from surgery or extraction. With the correct case selection and operator skill, periradicular surgery can be a predictable, economical option to tooth extraction and tooth replacement.

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