

Clinical Aspects of Endodontic Microsurgery – Case Report with 16 Months Follow-up

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Abstract

Endodontic microsurgery is a modern technique that integrate the use of microscope, root-end cavity preparation, and biocompatible root-end filling material, and has been shown to have a higher success than nonsurgical retreatment. The aim of this case report is to present the clinical aspects of endodontic microsurgery procedure.

Keywords: Microsurgery, Endodontic Surgery, Apical Surgery, MTA, retropreparation

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Introduction

Management of apical periodontitis in endodontically treated teeth is nonsurgical or surgical retreatment.^[1-4] Endodontic microsurgery is a modern technique that integrate the use of microscope, root-end cavity preparation, and biocompatible root-end filling material.^[5] Treatment can be performed with precision and predictability, provide removal of bacteria, and promote accelerated periapical tissue healing. It has been shown to have a higher success than nonsurgical retreatment.^[4] The aim of this case report is to present the clinical aspects of endodontic microsurgery procedure.

Case Report

A 34-year-old patient was referred to The Hospital of Lithuanian University of Health Sciences Kaunas Clinics Department of Dental and Oral Pathology for endodontic treatment. Few weeks ago, patient complained of pain and

swelling of the palate. General dentist made the incision in the palate, drained pus and started endodontic treatment of left maxillary lateral incisor. Constant drainage of pus prevented dentist from filling the canal, therefore the patient was referred to an endodontist. First, anamnesis was assessed – patient denied any previous trauma, main complaint was pain. Clinical examination revealed tenderness to percussion and palpation of left maxillary lateral incisor, swelling of the gingiva and sinus tract. Left maxillary central incisor had a filling, no tenderness to percussion and palpation. Intact left maxillary canine had normal reaction to cold testing (Polydent, Germany). No mobility of the teeth or periodontal pockets were presented. Dental radiograph showed large periapical lesion surrounding left maxillary central and lateral incisors, and a canine. Central incisor had a large metal post placed in 2/3 of root length and inadequate root filling. Lateral incisor filled with calcium hydroxide. (Fig. 1) At the same visit, canal treatment of left maxillary lateral incisor was performed under dental microscope

following ESE guidelines. After controlling drainage of pus, canal was irrigated with sodium hypochlorite 2,5%, sterile saline solution, EDTA 17%. Working length was determined, instrumentation was done using Protaper Gold (Dentsply Sirona, USA). Apex was closed with mineral trioxide aggregate (Handmix, Germany) (Fig. 2), rest of the canal space - filled with gutta-percha. After endodontic therapy, no antibiotics or pain medication were prescribed. Composite restoration was done by the general dentist. In cases of removing a large metal post, nonsurgical endodontic retreatment is associated with high risk of vertical root fracture. [6] After discussing treatment options, to treat left maxillary central incisor and address inadequate root filling including large metal post, patient opted for endodontic microsurgery.

By the second visit, patient had no clinical signs or symptoms. Sinus tract was resolved. (Fig. 3) Premedication was done: 2g Amoxicillin (Sandoz, Germany) and 25mg Dexketoprofenum (Berlin-Chemie, Germany). [7, 8] 15c blade was used for incisions: superior labial frenulum to mucogingival junction to maxillary lateral frenulum. Full thickness mucoperiosteal flap was raised, fenestration seen. (Fig. 4) Thinned buccal cortical plate was detached using blunt force. Surgery window increased using surgical tungsten burs. A capsule was visualized, and cystic fluid flowed out throughout small ruptures under pressure.

The cyst was extracted by detaching from the surrounding structures with a Lucas curette. After initial removal of the large portion of the cyst, remnants were detached by thorough curettage, rinsing with chlorhexidine 2%. When a clean working field was created, root tips of left maxillary central and lateral incisors were dissected using burs. (Fig. 5) Retro preparation was performed in the long axis of the left maxillary central incisor's root using ultrasonic tip KiS 2D (Young specialties, USA) to a depth of 3mm. (Fig. 6) The MTA was then inserted and compacted to fill the cavity. (Fig. 7) Wound was closed using 5-0 poliglecaprone and a mixture of single interrupted sutures and modified horizontal mattress sutures to elevate the labial muscle pull. (Fig. 8) Standard post-operative recommendations were given, antibiotics prescribed (Amoxicillin 1g 2x a day, 6 days). [7, 8] Control radiograph was performed. (Fig. 9.) Review appointment was scheduled after 1 week for suture removal and soft tissue healing assessment. The healing was uneventful, patient was satisfied. For bone healing assessment follow-up visits were performed. After 7 months, patient had no clinical signs or symptoms, bone healing was observed in dental radiograph. After 16 months, complete healing was confirmed in dental radiograph. (Fig. 10) [9] Left maxillary canine maintained a normal reaction to cold testing.

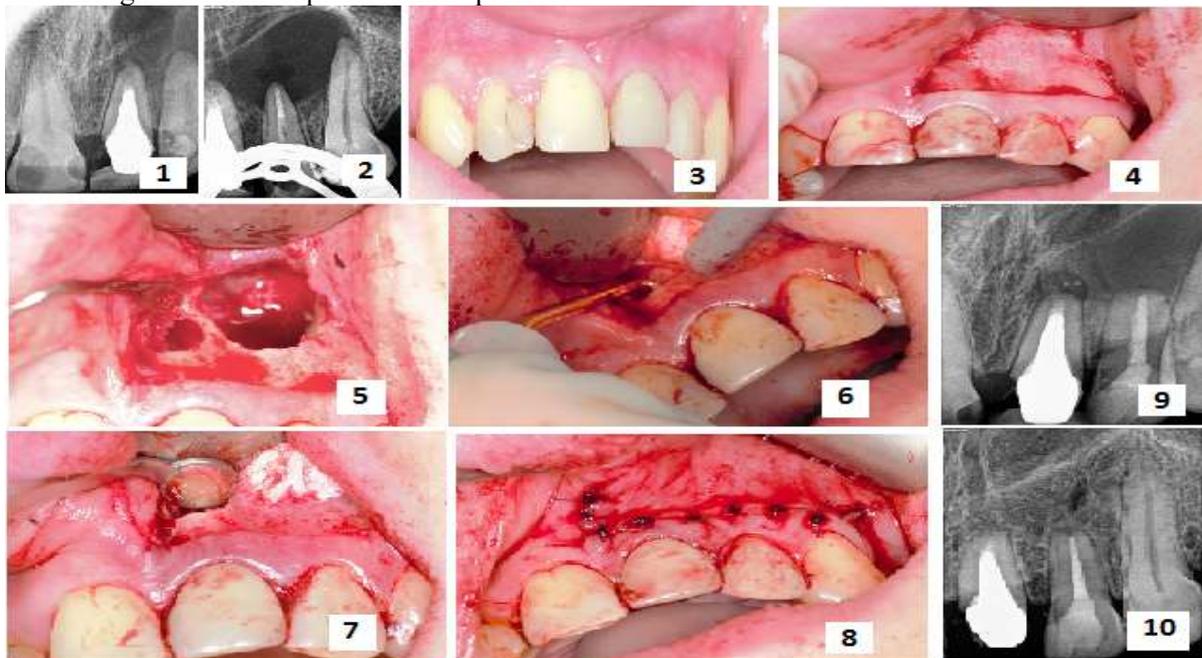


Fig. 1. Pre-treatment radiograph of the left maxillary central and lateral incisors; **Fig. 2.** Apex of the left maxillary lateral incisor closed with hydraulic calcium silicate cement; **Fig. 3.** Photograph before endodontic microsurgery; **Fig. 4.** Full thickness mucoperiosteal flap is raised, and fenestration can be seen; **Fig. 5.** Photograph after full removal of the cyst and dissection of the root tips of left maxillary central and lateral incisors; **Fig. 6.** The retro preparation performed in the long axis of the left maxillary central incisor; **Fig. 7.** Retrograde filling with hydraulic calcium silicate cement; **Fig. 8.** Sutured wound; **Fig. 9.** Control radiograph after endodontic microsurgery; **Fig. 10.** Follow up after 16 months.

Discussion

Endodontic microsurgery is predictable when performed using modern techniques, biocompatible and bioactive root-end filling materials, allowing tooth survival 79-100%.^[10] A substantial difference has been reported in surgery outcome between studies which use and do not use the microscope. To remove all the lateral canals and apical ramifications to prevent reinfection, it is recommended to do the root-end amputation of 3mm. The aim of root-end preparation is to remove the intracanal filling and irritants, and to create a cavity that can be properly filled, preparation should be at least 3mm.^[4] To prevent the outgrowth of bacteria and promote periapical tissue healing, root-end filling material should be biocompatible, dimensionally stable, resistant to resorption, bactericidal, bacteriostatic, manageable, and offer an exceptional seal.^[5, 11] MTA showed a tendency to better outcome results.^[10] The clinician should know techniques for MTA application and hermetic seal creation.^[12] For better results, correct techniques are as important as materials.^[4] Accurate assessment of pulp vitality is a key step for successful diagnosis and management of teeth involved in the cyst. If the tooth is vital, it can be preserved without endodontic treatment.^[13] While performing a precisely sized osteotomy, we managed not to damage vascularization of the canine and after one-year tooth remained vital.^[4] Follow-up should enable assessing of the healing: successful and can be expected to remain or condition is uncertain. Where result

cannot yet be determined, case should be followed-up for a longer period.^[9]

Conclusion

This case report shows that if endodontic microsurgery is performed under modern surgical techniques using appropriate root-end filling materials, successful outcome with evident healing is expected. To assess bone healing, follow-up after surgical endodontics is mandatory.

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Ethical Permission: Obtained

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