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Surgical Retreatment with Esthetic Rehabilitation – A Case Report

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Abstract

Clinicians often face challenges during treatment that may lead to failure. Like other dental procedures, endodontics is not exempt from setbacks. Common causes include improper mechanical debridement, residual bacteria in the canals and apex, suboptimal obturation quality, incorrect root canal filling length (over or under extension), and coronal leakage. Although endodontic treatments generally have a high success rate, failures still occur frequently due to these factors. Likewise, Endodontic re -surgery is required to manage unresolved infections or new pathological changes, particularly in cases where the primary treatment did not fully eliminate the problem.

Case: This case report discusses the surgical management of a recurrent radicular cyst in a 32-year-old female patient, requiring endodontic retreatment and re- surgery followed by esthetic rehabilitation. The

treatment involved re-root canal therapy, periapical surgery, and retrograde filling with Mineral Trioxide Aggregate (MTA), followed by ceramic crowns. Follow-up at 1, 3, and 6 months showed the patient was asymptomatic, with a reduction in lesion size. The case underscores the importance of thorough endodontic procedures to prevent recurrence, emphasizing the need for comprehensive understanding of canal anatomy, irrigation protocols, and mechanical debridement.

Keywords: Radicular cyst, Re- surgery, Mineral Trioxide Aggregate (MTA), Esthetic rehabilitation

Introduction

Radicular cysts, also referred to as periapical cysts, dental cysts, or apical periodontal cysts, are the most prevalent inflammatory odontogenic cystic lesions affecting the maxillary bones, accounting for more than 50% of all odontogenic cysts. These cysts typically arise as a chronic response to pulpal infection and are associated with untreated or inadequately managed periapical inflammation.[1] Despite advancements in endodontic procedures and apicoectomy techniques aimed at resolving such lesions, the recurrence of radicular cysts remains a significant clinical challenge. Studies indicate that the recurrence rate following enucleation ranges from 10% to 30%, reflecting the complex interplay of factors such as residual infection, incomplete removal of the cyst lining, or inadequate sealing of the root canal system.[2] This report delves into a unique case involving a recurrent radicular cyst that developed subsequent to failed endodontic therapy and a prior apicoectomy. It sheds light on the diagnostic complexities and therapeutic hurdles inherent in managing cases of residual periapical pathology, emphasizing the necessity for a meticulous and comprehensive approach to ensure optimal outcomes and prevent further complications.[3]

Case Report

A 32-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, complaining of pain in the upper front teeth region persisting for the past two months. (fig 1) She described the pain as mild and intermittent, specifically involving teeth 11 and 12. The patient provided a history of having undergone root canal treatment on teeth 11 and 12 twelve years ago, which was accompanied by surgical cyst enucleation and an apicoectomy. Upon clinical examination, tooth 11 exhibited discoloration, and both teeth 11 and 12 were found to be tender on percussion. Radiographic evaluation revealed evidence of previous root canal treatment in both teeth, though the obturation appeared unsatisfactory. (fig 2) Additionally, a well-defined radiolucent lesion was observed, extending from the distal aspect of tooth 12 to the mesial aspect of tooth 11. Cold test with respect to 21,13 confirmed non-involvement of adjacent teeth. Based on these clinical and radiographic findings, a provisional diagnosis of a periapical cyst was made with 11 and 12.

Figure 1: Pre- operative- clinical

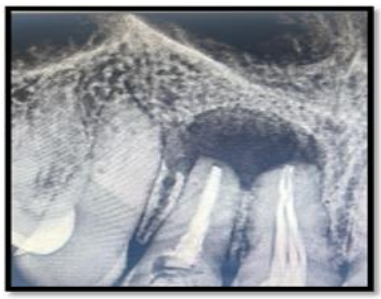

Figure 2: Pre- operative radiograph

The treatment plan decided was Re root canal treatment with respect to 11, 12 along with periapical surgery and retrograde filling with MTA followed by Prosthetic rehabilitation. Rubber dam isolation done extending from 14 to 23. (fig 3.1,3.2) Access was gained using a round bur and Gutta percha was removed from 11,12 with the help of H- files. Working length was established with the help of apex locator and confirmed with a radiograph. A 25k file was used for the same. (fig 4) Working length was estimated to be 20 mm and 21 mm with 11 and 12 respectively. Cleaning and shaping was done with Hand pro taper files until F2.Copious irrigation was done alternatively with saline and 3% sodium hypochlorite. Irrigants were activated by sonic irrigator.A calcium hydroxide dressing was placed in both the canals as an intracanal medicament.A final irrigation was done with 2 percent chlorhexidine solution. Master cones of #25- 6% were selected for 11 and 12.(fig 5)Obturation was done with the help of AH plus sealer using cold lateral compaction technique.(fig 6)

Figure 3.1, 3.2: Rubber dam isolation

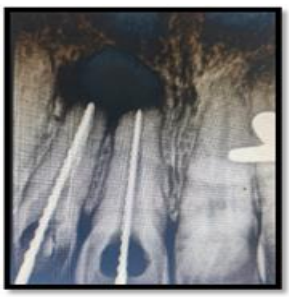

Figure 4: Working length estimation

Figure 5: Master cone selection

Figure 6: Obturation

Following obturation, a re-surgical procedure was planned. As part of the presurgical work-up, investigations including bleeding time, clotting time, and blood glucose levels were carried out to assess systemic health and ensure surgical readiness. Prophylactic antibiotic coverage was provided with Augmentin 625 mg (a combination of amoxicillin and clavulanic acid), administered to minimize the risk of postoperative infection. An anti-inflammatory agent, Enzoflam (a combination of diclofenac, paracetamol, and serratiopeptidase), was also prescribed to manage inflammation and pain. Endodontic surgery was commenced under local anesthsia and a full thickness mucoperiosteal trapezoidal incision was given. A periosteal elevator was used to raise the flap. Cyst enucleation along with ostectomy was done and the cyst sample was sent for biopsy. (fig 7) Root resection was done with a straight fissure bur and a zero degree bevel was given followed by retrograde preparation with E10D tip and Mineral Trioxide Aggregate (MTA) was placed via orthograde approach, using a plastic filling

instrument to ensure precise delivery and adaptation of the material within the canal. (fig 8)

Single interrupted sutures were given. (fig 9) (fig 10)1-week post surgery, sutures were removed and a post obturation restoration was done with the help of composite resin restoration.

Figure 7: Cyst ennucleation

Figure 8: Root resection followed by MTA placement

Figure 9: Single interrupted sutures

Figure 10: Post – surgery radiograph

For Esthetic rehabilitation, Shade selection was done in natural day light Shade C3 was selected with the help of vita shade guide.(fig 11) Crown preparation with shoulder margin with respect to 11 and 12.(fig 12) A double step putty impression was taken and temporary crowns were made with Composite resin. Zirconia crowns were cemented with the help of luting glass ionomer cement.(fig 13) (fig 14 – 3 months follow- up, fig 15 – 6 months follow- up)

Figure 11: Shade selection

Figure 12: Tooth preparation

Figure 13: Zirconia crown cementation

Figure 14: 3 months follow - up

Figure 15: 6 months follow - up

Discussion

The success rates of endodontic surgery vary significantly depending on the treatment approach. Friedman observed a notable improvement from 58.9% to 79.6% when pre-surgical retreatment was undertaken, highlighting the value of comprehensive case preparation.[4] However, Torabinejad found that apical surgery success rates decline over time, dropping from 77.8% at 2–4 years post-surgery to 62.9% after six years, suggesting that long-term outcomes require careful consideration.[5] Meanwhile, Tsesis reported a remarkable 91.6% success rate for modern techniques incorporating microscopes and MTA, reinforcing the advantages of advanced technology in endodontics.[6] In contrast, Setzer demonstrated a stark difference between traditional methods, which showed only 59% success, and modern microsurgical techniques, which achieved 94%—underscoring the impact of refined surgical approaches on prognosis. Together, these findings stress the importance of thorough treatment planning and the need for intervention when surgical outcomes fall short.[7]

Failures in endodontic surgery, as outlined by Saunders, are often attributed to several key factors.[8] Persistent microbial contamination within the root canal system, coupled with the risk of reinfection due to coronal leakage, remains a leading concern. Extraradicular infections, often resistant to conventional treatment, further complicate healing. Additionally, an inability to effectively seal the root canal system from periradicular tissues can result in persistent inflammation. Anatomical challenges, including complex root structures, may hinder effective disinfection and obturation, while poor surgical techniques can exacerbate complications. Addressing these issues requires a meticulous approach to diagnosis, treatment planning, and execution.

In this particular case, the recurrence of a dental cyst appears to stem from insufficient initial treatment and a lingering underlying infection. Incomplete removal of the cyst can also contribute to its resurgence, emphasizing the necessity of a comprehensive surgical strategy. A profound understanding of canal anatomy, meticulous irrigation protocols, and precise mechanical debridement are pivotal in achieving long-term success. Without these elements, persistent pathology may compromise treatment outcomes, reinforcing the importance of precision and expertise in every stage of the procedure.[9]

Conclusion

Conservative treatment is often well-received by some patients; however, it requires multiple therapy sessions and may not always yield satisfactory results. In contrast, surgical treatment appeals to certain patients because it offers a faster solution. Dental extraction, on the other hand, is commonly opted for in cases of molars with chronic apical periodontitis, either due to the severity of the lesion or the patient's unwillingness to pursue conservative treatment. Pain perception in patients is closely linked to their psychological state .[10] In dental practice, relying on a single therapy alone is not entirely effective. A combination of approaches, including psychological preparation, pharmaco-therapeutic sedation, and locoregional anesthesia, yields a cumulative and more positive impact.[11]

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