

Surgical management of periapical lesions

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Abstract

Bacterial infection of dental pulp results first in pulpal destruction and ultimately in the development of a periapical lesion with the concomitant resorption of bone. Surgical intervention is a last resort to maintain a tooth with a periapical lesion that cannot be managed with conventional endodontic re-treatment. The main goal of apical surgery is to prevent bacterial leakage from the root-canal system into the peri radicular tissues which is done by placing a tight root-end filling

following root-end resection. The most important step in apical surgery is to identify possible leakage areas at the cut root face and subsequently to ensure adequate root-end filling. The purpose of this case report is to present the results of the follow-up study conducted on the patient and discuss the success rate of the retrograde root filling.

Keywords: Apicoectomy, re-treatment, resection, periapical lesion.

Introduction

Apical surgery refers to the surgical management of a tooth with a periapical or periradicular lesion that cannot be resolved with an orthograde endodontic approach. It is often considered as a last resort to preserve a tooth when conventional endodontic retreatment is not feasible or is associated with therapeutic risks.¹ Apicectomy procedure was well described and defined by J. Farrar as “a bold act, which removes the entire cause of disease and which will lead to a permanent cure which may not be the best in the end, but the most humane.”² Periradicular surgery includes three critical steps to eliminate persistent endodontic pathogens: 1) surgical debridement of pathological peri radicular tissue, 2) root-end resection (apicoectomy), and 3) retrograde root canal obturation (root-end filling).³

Periapical or peri radicular lesions are barriers that restrict the microorganisms and prevent their spread into the surrounding tissues; microorganisms induce the periapical lesions, primarily or secondarily.^{4,5} The bone is resorbed, followed by substitution by a granulomatous tissue and a dense wall of polymorphonuclear leukocytes (PMN).

It must be noted that the presence of a lesion in a radiograph should not be the only reason for commencing retreatment in teeth with proper root canal treatment. These teeth might remain in a state of asymptomatic function as the incidence of flare-up is less than 6% in 20 years.⁶ Therefore, placement of a sound coronal restoration immediately after the completion of non-surgical endodontic treatment is highly recommended even if a follow-up period is needed to place more complicated restorations such as crowns and bridges.⁷

Case report

A 35-year-old female patient reported to the Department of Conservative Dentistry and Endodontics of the Desh Bhagat Dental College & Hospital, Mandi Gobindgarh with complain about pain in tooth number 21 and 22, which presented a history of endodontic treatment. The clinical examination revealed a positive response to percussion and palpation in the periapical region of 21 and 22.

Periapical radiographic examination revealed a radiolucent circumscribed lesion around the periapical region of tooth no. 21 and 22 presenting features of periapical periodontitis as well as unsatisfactory endodontic treatment of the same teeth was founded as depicted in Figure 1 & 2.

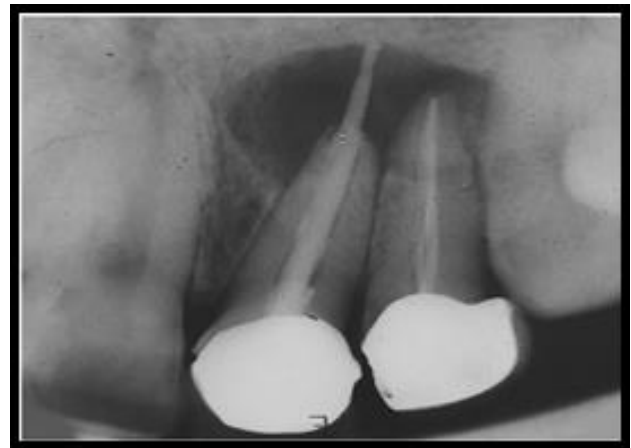


Fig 1: Pre-operative



Fig 2: pre-operative photograph

The final diagnosis was symptomatic periapical periodontitis, and the treatment plan was to retreat the root canal and posteriorly to perform an endodontic surgery (apicoectomy) and to seal the periapical area with MTA plus cement to prevent recontamination of root canal.

The first stage of treatment involved the removal of gutta percha cones from the canals of both the tooth with the help of H-files (Figure 3 & 4) and the root canals were filled with Calcium hydroxide as an intracanal medicament for the healing and remineralization of the periapical region and then the radiographs were taken (Figure 5).

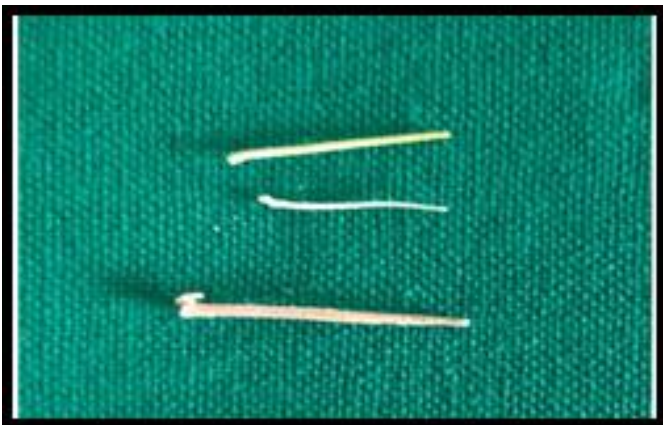


Fig 3: Gutta-percha cones removed from root canal



Fig 4: radiograph after gutta-percha removal

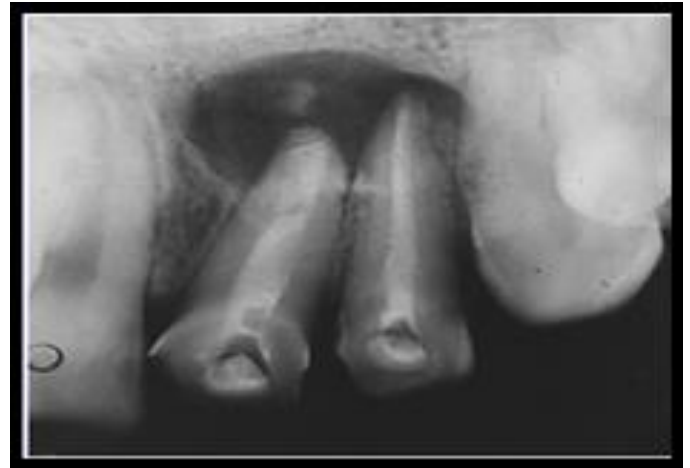


Fig 5: After calcium hydroxide placement

After a period of 1 week of observation, the second stage of treatment was started.

Obturation of both the teeth was done with gutta percha and zinc oxide eugenol as sealer.

A horizontal flap was raised by making intrasulcular incisions with the help of blade of size #15 (Figure.6&7) and periapical surgery was done by cutting 2mm of root end tip with tapered fissure bur under intense irrigation with sterile saline solution and MTA was filled as root end filling material (Figure 9&10) and the flap was sutured back on its place.



Fig 6: flap reflection



Fig 7: after apicoectomy



Fig 10: mta plus used as retrograde filling material
After a period of two days, crown preparation of both the teeth was performed (Figure. 10) and further after 2 days crown cementation was done (Figure.11).

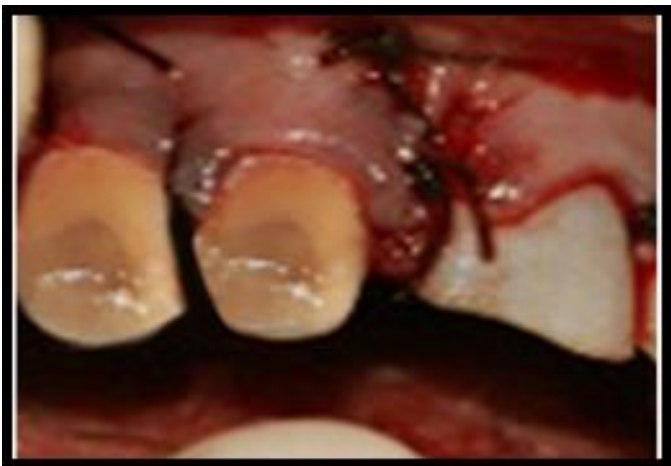


Fig 8: after suturing



Fig 11: crown preparation



Fig 9: radiograph after apicoectomy & retrograde filling



Fig 11: crown cementation w.r.t. Tooth no. 21 and 22

After two months of treatment, the patient was recalled for follow up and with the help of radiograph it was perceived that there was absence of painful symptoms and periapical bone repair (Figure. 12).

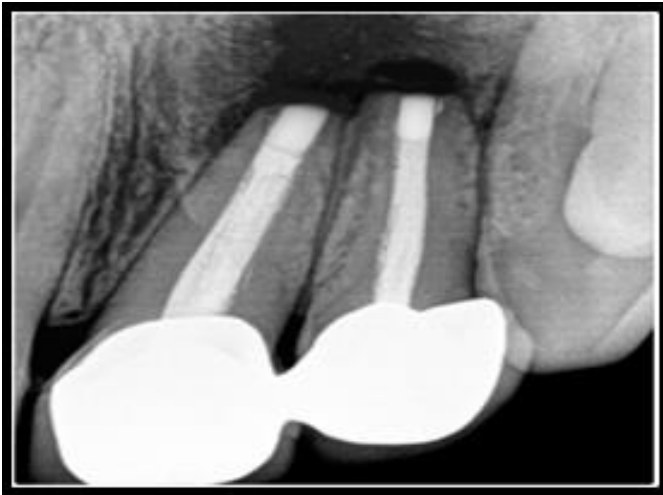


Fig 12: post-operative radiograph

Discussion

The diagnosis of such cases has a direct effect on the treatment plan and outcome. The treatment plan was to retreat the infected tooth and associate this retreatment with surgical intervention, as the conventional endodontic retreatment alone is effective in limited cases, and this depends mainly type of periapical lesion, its location, and the professional ability to approach it for repair.⁷ However, surgical intervention has a good prognosis when followed by apical sealing with root-end fillings.⁸

Leonardi et al.⁹ stated that several factors can influence apicoectomy success, such as: the root region where the apicoectomy is done; the drill type employed, as well as the cut angle. It is important to obtain the cut surface as regular as it can. The apical cut must involve anatomical variations such as the presence of isthmuses and accessory canals, because they act as a reservoir for bacteria and necrotic pulp tissue, which can lead to treatment failure. After apicoectomy, it must be observed

whether the filling material which in this case is gutta percha is not displaced, using a microscope, because failures may be invisible with unaided eyes.

In this case report, MTA plus cement was used as it presented a reparative feature and provided sealing of surgical areas.¹⁰ However, not only MTA plus but also many Bioceramic cements such as 5MO and Bio dentine have the same features.^{11,12} MTA was indicated many years ago as an effective root-end filling material due to its biocompatibility and sealing ability, and since then, many Bioceramic cements with the same intention presented similar results. As well, modified MTA forms were indicated for high stress-bearing areas and especially for surgical sites.¹³

Conclusion

MTA plus cement induces repair of periapical lesion, has the ability to seal the exposed periapical area of the tooth, and has a good marginal adaptation. The success obtained in this case depended mainly on root canal and surgical site where the root end filling material was applied. The surgical technique applied in this case, apicoectomy, was appropriate. This was proven by both clinical results and radiographs.

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