CASE REPORT

Beyond The Scalpel: Non Surgical Strategies For Periapical Lesion Healing

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Abstract

INTRODUCTION: *Though root canal instrumentation along with irrigation greatly reduces the numberof bacteria in the infected canals, it is difficult to obtain complete disinfection in all cases. The useof intracanal medicaments helps in reducing or inhibiting the growth of microbes that are leftbehind after cleaning and shaping to prevent reinfection. This will ensure lesion reduction orresolution.*

OBJECTIVE: *The objective of this was to attain complete resolution of large periapical lesion through non surgical root canal treatment.*

CASE DESCRIPTION: *A 35-year-old female reported to the outpatient Department of Conservative Dentistry and Endodontics, Kothiwal Dental College and Research Centre, Moradabad, presented with a chief complaint of pus discharge in the lower right back tooth region since 6 months.There was no history of pain and any other discomfort.*

CONCLUSION: *For the treatment of periapical lesions, nonsurgical therapy should beconsidered as first-line treatment option as it proves to be a more conservative approach.*

KEYWORDS: Endodontics; Non-surgical treatment; Infection; Odontogenic Cysts

1. Introduction

Periapical lesions of endodontic origin are mostly produced by an inflammatory response at the root apices of teeth with non vital pulps. It is caused by imbalance between microbial factors and host defences at the interface between infected radicular pulp and periodontal ligament those results in local inflammation, resorption of hard tissues, destruction of other periapical tissues.[1,2]

Pulp disease and bacterial infection of the pulp space, result in periapical lesions. These lesions are usually found during routine radiographic examinations or followed by patient's extreme pain sensation. Periapical lesions are mostly classified as radicular cysts, dental granulomas or abscesses. Among all periapical lesions, the incidence of cysts varies from 6% to 55%.[3] Also the occurrence of granulomas spans from 9.3% to 87.1%, and of abscesses from 28.7% to 70.07%. According to clinical evidence, lesions that are larger in size are most likely radicular cysts. Still, some of these large lesions may appear to be granulomas.than 90% can be categorized as dental granulomas, radicular cysts or abscesses. Periapical lesions cannot be differentially diagnosed into cystic and noncystic lesions based on the radiographicfeatures.

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Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions and 94.4% of complete and partial healing following nonsurgical endodontic therapy has also been reported. All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures. Numerous non-surgical methods have been proposed to treat periapical lesions.[4] Two techniques named decompression technique and aspiration- irrigation technique aid in decreasing the hydrostatic pressure resulting in shrinkage of the lesion. At the same time the more conservative non-surgical approach that can be treated by intracanal medicaments can't be ignored.[5]

Though root canal instrumentation along with irrigation greatly reduces the number of bacteria in the infected canals, it is difficult to obtain complete disinfection in all cases. Microbes left behind after obturation can proliferate into the isthmuses, apical deltas, and dentinal tubules where certain microbes are obstinate to conventional cleaning and shaping and hence cause persistent infections. Hence, intracanal medicaments are placed in canals to control such microbes.[6,7] Calcium hydroxide (CH) is the most widely used medication because of its antibacterial activity which can be used in various combinations. Among these combinations, Metapex, which contains 60% CH paste and38% iodoform in silicone oil, is frequently used.[8]

This article suggests that surgical removal of periapical lesion of pulpal origin is not mandatory, and that, irrespective of the size of the lesion, every effort should be made to treat such lesions by conservative means.

1. Case report

A 35-year-old female reported to the outpatient Department of Conservative Dentistry and Endodontics, Kothiwal Dental College and Research Centre, Moradabad, presented

with a chief complaint of pus discharge in the lower right back tooth region since 6 months.There was no history of pain and any other discomfort. Clinical examination showed the presence of a deep carious lesion in #46, and periapical radiograph revealed radiolucency involving the enamel, dentin, and pulp associated with a periapical radiolucency. Pulp sensibility tests failed to produce any response in the tooth. The clinical and radiographic findings were suggestive of periapical pathology in relation to #46.

The treatment plan for the tooth #46 was decided as incision & drainage of swelling in the alveolar mucosa followed by root canal therapy on tooth #46.

The tooth was anesthetized with lidocaine. The suppurative yellowish fluid was drained by performing incision and drainage in the alveolar mucosa adjacent to the tooth #46. The intraoral swelling was compressed followed by copious irrigation with saline.

Access cavity was prepared using round diamond bur and canals were negotiated using #10 K file. Working length was determined and biomechanical preparation was done upto 25/6% taper followed by irrigation with sodium hypochlorite (3% NaOCl) and normal saline. The root canals were filled with non settable calcium hydroxide as intracanal medicament. The access cavity was then sealed using temporary restoration, Cavit and patient was recalled after 10 days. Meanwhile, antibiotics and analgesics were prescribed for duration of 5days.

In the second appointment which was done after 10 days, the intra-oral swelling was completely healed and the temporary restoration was removed .The root canals were irrigated by flushing with normal saline and teeth were clinically asymptomatic. After proper cleaning of the root canals, the canals were dried using absorbent paper points and obturation was done. Clinical and radiographic evaluation showed no pain or sensitivity to palpation and percussion with complete healing of the lesion in relation to tooth #46.

Figure 1: *Preoperative Extra-oral swelling*

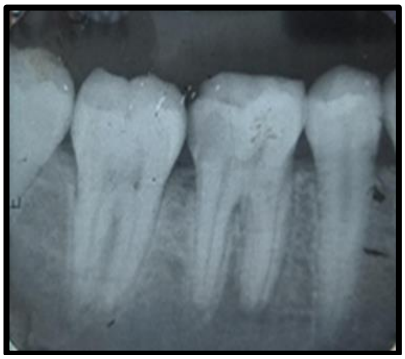

Figure 2: *Preoperative radiograph*

Figure 3: *Intraoral swelling*

Figure 4: *Incision and drainage*

Figure 5: *Working length radiograph*

Figure 6:*Application of $Ca(OH)_2$*

Figure 7: *Mastercone placement*

Figure 8: *Postobturation radiograph*

Figure 9: *Post treatment view*

Figure 10: *Post operative*

2. Discussion

Necrotic pulps act as nidi for microbial growth. These organisms subsequently release toxins into the periapical region that trigger the inflammatory reaction and bone resorption. Cleaning and shaping of the root canal and microbial eradication are the key factors in achieving a successful outcome nonsurgical root canal treatment should be done at first, which has 42 to 74% of healing of lesions.[9]

In the present case, the main reason for the origin of pain and swelling in relation to #46 should be the tooth decay in relation to #46 which is pulpally involved. The clinical management of an acute apical abscess was performed by root canal treatment in addition with the systemic administration of amoxicillin and clavulanic acid for 5 days to achieve an effective antibacterial effect. Here along with root canal treatment, pus drainage was done to relieve the pain by decreasing the apical infection. Non settable calcium hydroxide was placed within the root canals as intracanal medicament. Intracanal medicaments are indicated for antibacterial properties and help in reduction of inflammation[10].

To effectively eliminate bacteria in the dentinal tubules, intracanal medication with CH should remain in the canal for at least seven days. The antibacterial effect is due partly to its high pH 12, which prevents the growth and survival of many oral bacteria. CH disrupts the microbial cell wall

lipopolysaccharides in gram-negative organisms and hampers membrane transport mechanisms, resulting in cell death. The primary advantage of CH is its ability to kill microorganisms in the absence of direct contact by absorbing the CO_2 required for bacterial growth and by the release of hydroxyl ions, which diffuse into dentinal tubules. CH paste affects periapical healing and repair by eradicating residual microorganisms, controlling inflammation, stimulating calcific tissues, counteracting acidic pH of osteoclasts, and neutralizing endotoxins.[11]

Metapex, which contains 60% CH and 38% iodoform in silicone oil, is widely used. The antimicrobial action of it was evident at deeper tubules. Its superior antibacterial effects were demonstrated at dentinal tubule depths even up to 250 µm. Metapex contains silicone oil as its vehicle and has a pH below that which is effective to kill *E. faecalis*.[12] The greater antimicrobial action of Metapex could be due to the presence of iodoform and the oily vehicle that increases the availability of the active agent for a prolonged duration. This increases the eradicative effect on *E. faecalis* and other bacteria. Not only is iodoform effective as a medicament, it has also been shown to be host-tissue friendly and hence often used as a resorbable medicament in primary pulpectomies.

According to Guttman, the success of endodontic treatment depends on the debridement and neutralization of tissue, bacteria or inflammatory products that is present in the root canal.[9] In the present study sodium hypochlorite was used as an intracanal irrigant to disinfect canals because it is effective against E. faecalis and has pulp dissolving ability.

This case involves the use of aspiration- irrigation technique involves aspirating the fluid using a wide gauge needle attached to a syringe. The needle penetrates the lesion through the buccal mucosa, creating a buccal wound, and exits through the palatal mucosa creating a palatal wound that later act as a pathway for the escape of the irrigant. [13]

In general, non surgical treatment or retreatment will be the preferred choice because it seems to provide the most benefit with the lowest risk. Surgical treatment is indicated only when nonsurgical treatment or retreatment is impractical or unlikely to provide the desired outcome. It is now believed that the activated macrophages in the periapical lesion are the reason for delayed healing of the lesions in the absence of bacterial antigens. The futuristic view of treating the periapical lesions include placement of biodegradable local sustained drug delivery points into the lesion before obturating the tooth to deactivate the macrophages and enhancing the faster healing of the lesions.

3. Conclusion

The present case report demonstrates the efficacy of endodontic treatment in reducing periapical lesion and swelling. For any successful endodontic treatment, the clinician should have a proper knowledge and understanding of canal configurations and variations with radiographic evaluation. A non-surgical approach should always be the first option before attempting a surgery although it seems to be little time consuming. Regular change of metapex as intracanal dressing and root canal therapy has proven to be very beneficial in complete healing of the periapical lesion in this case.

4. References

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