ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 3, May - 2023, Page No. : 261 – 267

Non-surgical management of a periapical lesion – A case report.

[1]Dr. Jayalakshmi PA, Department of Conservative Dentistry and Endodontics, A J Institute of Dental Sciences, Rajiv Gandhi University of Health Sciences, Mangalore, Karnataka, India.

[2]Dr. Kalpana M B, Department of Conservative Dentistry and Endodontics, A J Institute of Dental Sciences, Rajiv Gandhi University of Health Sciences, Mangalore, Karnataka, India.

[3]Dr. Divya Shetty, Department of Conservative Dentistry and Endodontics, A J Institute of Dental Sciences, Rajiv Gandhi University of Health Sciences, Mangalore, Karnataka, India.

[4]Dr. Rajaram Naik, Department of Conservative Dentistry and Endodontics, A J Institute of Dental Sciences, Rajiv Gandhi University of Health Sciences, Mangalore, Karnataka, India.

Corresponding Author: Dr. Jayalakshmi PA, Department of Conservative Dentistry and Endodontics, A J Institute of Dental Sciences, Rajiv Gandhi University of Health Sciences, Mangalore, Karnataka, India.

Citation of this Article: Dr. Jayalakshmi PA, Dr. Kalpana M B, Dr. Divya Shetty, Dr. Rajaram Naik, “Non-surgical management of a periapical lesion – A case report”, IJDSIR- May - 2023, Volume – 6, Issue - 3, P. No. 261 – 267.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

For non-vital teeth with periapical cysts, routine root canal therapy alone is insufficient. Conventional root canal treatment should be combined with conservative and surgical treatment of cysts. Aspiration, decom pression, and repeated intra canal dressing with calcium hydroxide [Ca $(OH)_2$] are modern non-surgical therapy alternatives. A 24 - year - old female patient reported to the Department of Conservative Dentistry and Endodontics at AJ Institute of Dental Sciences, Mangalore, with a chief complaint of broken upper front tooth region since ten years. Clinical and radiological signs showed a chronic Periapical abscess associated with 11, 12, 21. non-surgical endodontic treatment and placement of intra-canal calcium hydroxide medication were performed. Radiographic follow-up1year later showed progressive regression of Periapical radiolucency without clinical symptoms. Periapical lesions respond well to nonsurgical endodontic treatment and should be considered as a primary treatment option.

Keywords: Nonsurgical Endodontic Therapy, Periapical lesions, Radicular Cyst, Calcium Hydroxide, Intracanal medicament, Periapical healing

Introduction

Bacterial infection of the dental pulp may lead to periapical lesions [1]. They are typically discovered during a normal dental radiography check or after experiencing severe tooth pain.

Most of the periapical lesions (>90%) can be classified as dental granulomas, radicular cysts or abscesses. The incidence of cysts within Periapical lesions varies between 6-55% [2].

The incidence of Periapical granuloma ranges from 9.3 % to 87.1% and the incidence of abscesses ranges from 28.7% to 70.07% [3].

The basic premise of any non-surgical endodontic treatment is to have a conventional orthograde approach. The action of calcium hydroxide [Ca $(OH)_2$] as an intracanal medication is exceptional. The ionic dissociation of Ca (2+) and OH (-) ions and their impact on vital tissues, the induction of hard tissue deposition, and the antibacterial capabilities are its mechanisms of action.

The ultimate goal of endodontic therapy should be to avoid surgical intervention and restore the affected teeth to a condition of health and function. Initially, conservative nonsurgical methods should be used to treat all inflammatory periapical lesions. Only when nonsurgical methods have failed is surgical intervention advised. Additionally, surgery has a number of limitations that prevent it from being used to treat periapical lesions. According to numerous studies, endodontic therapy for teeth with periapical lesions has an 85% success rate [4,5]. Following nonsurgical endodontic treatment, a high percentage of 94.4% of periapical lesions completely and partially healed has also been reported [6].

The current case report describes nonsurgical endodontic treatment of Periapical lesions, which can be viewed as an efficient and viable alternative that can restore esthetics and function.

Case report

A 24-year-old female patient reported to the Department of Conservative Dentistry and Endodontics at AJ Institute of Dental Sciences, Mangalore, with a chief complaint of broken upper front tooth region since 10 years. Past history provided by the patient revealed trauma to maxillary anterior teeth 10 years back. During a routine clinical examination, a soft tissue swelling near teeth 11, 21, and 12 in the labial vestibule was dis covered. Hard tissue analysis of tooth 11 indicated an Ellis class III fracture. Thermal and EPT vitality tests were performed, and the results showed a negative response for teeth 11, 21, and an early response for tooth 12. The anterior teeth showed no signs of mobility or displacement.

Radio graphic examination with Periapical radio graph revealed coronal radiolucency approximating pulp with respect to tooth 11 with periapical radiolucency extending to tooth 12, 21(Figure 1). In relation to 11, 12, 21, the radiographic and clinical signs were suggestive of a chronic periapical abscess. The diagnosis and treatment options were explained to the patient. They preferred nonsurgical endodontic therapy and informed consent was taken. As a result, endodontic treatment was planned with the possibility of a later need for additional surgical intervention.

In relation to 11,12,21, the access cavity was prepared. The root canals were instrumented and heavily irrigated with sterile normal saline to remove the exudate, which was a clear, straw-coloured fluid that was exuding from the canals. Working length was determined with size 10 k file (MANI, INC) for tooth 11 to be 19 mm, 21 to be 20 mm and 12 to be 19.5mm (Figure 2).

Instrumentation was placed about 1mm beyond the apical foramen (figure 3). For teeth 11, 21, and 12, a step-back approach was used for root canal preparation. After each instrument operation, normal saline (FRESENIUS KABI) was utilised to liberally irrigate the canals with a 27-gauge needle. Prior to the end of active drainage, no intracanal medication had been placed into the canal. The calcium hydroxide (Deepthi dental products) dressing was applied once the drainage had totally stopped. Temporary repair (DPI ZINC OXIDE) was used to temporarily seal the access cavity. The patient was monitored closely. The intracanal Ca $(OH)_2$ dressing was replaced four times at seven-day intervals. After four rounds of calcium hydroxide intracanal medicament application, teeth 11, 12 and 21 were asymptomatic following which obturation was done with 2% gutta percha (DIADENT) and zinc oxide eugenol sealer (DPI, ZINC OXIDE) using lateral condensation technique (Figure 4). Throughout postoperative recalls, the patient exhibited no symptoms. A radiographic follow-up at one, three, six, and one year after therapy (Figure 5-8) showed complete resolution of periapical radiolucency. After six months of obturation prosthetic rehabilitation of tooth 11,12,21 was done with zirconia crown (Figure 9).

Figures

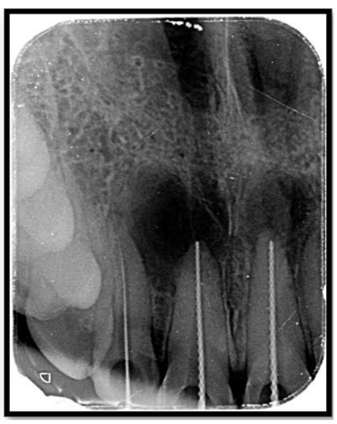

Figure 1: Preoperative radiograph of tooth 11,21,12

Figure 2: Working Length Determination of tooth 11,12,21

Figure 3: Radio graph showing over instrumentation performed.

Figure 4: Obturation done irt 11,21,12

Figure 5: 1 month follow up.

Figure 6: 3 month follow up

Figure 7: 6 month follow up.

Figure 8: 1 year follow up.

Figure 9: Prosthetic rehabilitation of tooth 11,12,21 was done with zirconia crown

Discussion

The proliferation of quiescent epithelial cell rests of Malassezin apical periodontitis lesions is assumed to be the primary cause of apical cysts (pocket and true) [7]. Because of this, apical cysts should be viewed as apical Perio dontitis with cyst formation. When the stimulus that triggers it is removed, the self-limiting process of hyper plasia goes into remission.

Additionally, apical cysts (pockets or true cysts) are categorised by the World Health Organisation (WHO) as inflammatory lesions rather than neoplastic lesions. Because of a reduction in periapical inflammation, it has been shown that massive cyst-like apical periodontitis lesions can shrink and even completely recover after non-surgical endodontic therapy [9].

Inflammatory mediators, pro-inflammatory cytokines, growth factors secreted by innate and adaptive immune cells, and apoptosis in the epithelial cells of the cyst's lining epithelium will all diminish if periapical inflammation is reduced.[10]

In cases when periapical lesions are seen on radiographs, Bhaskar SN has recommended that root canal instrumentation be performed 1 mm beyond the apical foramen. The cyst resolves as a result of the transient ulceration and inflammation of the epithelial lining. Bender confirmed that penetration of the root canal instrument from the apical region to the radiolucent Center produced drainage, thus relieving pressure in his discussion of Bhaskar's hypothesis.

Following the cessation of drainage, fibroblasts proliferate and deposit collagen, which constricts the capillary network and starves the epithelial cells, causing them to degenerate and make them susceptible to being engulfed by macrophages [11]. Instrumentation was performed in the current case beyond the apical foramen and cyst as evidence for this result.

According to numerous studies, endodontic therapy for teeth with periapical lesions has an 85% success rate. A high rate of 94.4% of complete and partial healing of small Periapical lesions was also recorded after non-surgical endodontic treatment.

Although large periapical lesions have traditionally been treated surgically, calcium hydroxide treatment offers a more conservative non-surgical option [11].

It has been the most widely used and well-tested intra canal medication since Ca $(OH)_2$was first introduced in 1920. It has a pH of 12.5 and it diffuses into calcium and hydroxyl ions.

This hydroxyl ion, an oxidant free radical, disrupts DNA, damages cell membranes, denaturates proteins, and counteracts the effects of bacterial endotoxins to carry out its microbicidal function. Additionally, tissue resolving ability and tooth resorption are inhibited by the oxidant free radical. Although it has a bactericidal action, induces hard tissue creation during repair, and dissolves tissue, but is not considered biocompatible due to its long tissue persistence.

It has antibacterial properties due to its influence on bacterial cytoplasmic membrane, protein denaturation, DNA damage, carbon dioxide uptake, lipo poly saccharide, and hygroscopic activity [14].

Despite being regarded as a safe substance, $Ca(OH)_2$has been linked to a few negative side effects, such as bone necrosis and persistent inflammation in mechanically repaired perforations, neurotoxicity, damaged epithelium with or without cellular atypia, cytotoxicity in cell cultures, when applied to hamster cheek pouches, and after early Ca $(OH)_2$ dressing of avulsed teeth c cellular damage was observed In addition , several authors noted adverse effects when material was extruded under high pressure during root canal treatment[11].

However, only a few studies have shown that intracanal Ca $(OH)_2$placement would directly affect Periapical inflammatory tissue by causing hydroxyl ions (OH-) to diffuse into the dentinal tubules. This would promote osseous repair and periapical healing.

It also stops osteoclastic activity in regions of root resorption. Additionally, a previous study found that although accidentally injected calcium hydroxide paste into the periapical lesion had no negative effects, healing could be delayed.

It has been discovered that calcium hydroxide is resorbed extra Radi cularly without any negative effects and has demonstrated clinical and radiological success [12].

According to Negri et al., intra canal medications should only be used as an adjuvant to cleaning and shaping, never as a substitute. The reduction of this osteoclastic activity requires aspiration and decompression of the cysts, as an increase in osteoclastic activity results from an increase in the hydrostatic pressure of the cyst. In two years of treatment, periapical lesions cure in about 70% of cases.

Pressure is released and the cyst is strangled when instrumentation is increased by 1 mm beyond the apex. As a result, a cyst becomes granulomas and progress sively heals. A big peri radicular lesion that responds well to nonsurgical therapy may have direct connection with the root canal system (apical pocket cyst).

Clinical studies confirm that simple non-surgical endodontic therapy with proper infection control can promote healing of large lesions.[13].

Conclusion

Surgery is not necessary in the majority of comparable clinical circumstances when RCT is used in conjunction with recurrent intra canal dressing.

Surgery should only be used in cases where other treatments have failed and where there are true cysts to avoid its risks. Hence a non-surgical method should always be considered before surgical way of management.

References

1. Moller AJ, Fabricius L, Dahlén G, Ohman AE, Heyden G. Influence on periapical tissues of indigenous oral bacteria and necrotic pulp tissue in monkeys. Scand J Dent Res 1981; 89:475-84.
2. Nair PNR, Pajarola G, Schroeder HE. Types and incidence of human periapical lesions obtained with extracted teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod1996; 81:93-102.
3. Balaji Tandri S. Management of infected radicular cyst by surgical decompression. J Conserv Dent 2010; 13:159-61.
4. Caliskan MK. Prognosis of large cyst-like peri apical lesions following non-surgical root canal treatment: A clinical review. Int Endod J. 2004; 37 (6): 408-16.
5. LM Lin, Domenico R, Jars hen L, PA Rosenberg. Non-surgical Root Canal Therapy of Large Cyst-like In flammatory Periapical Lesions and Inflammatory Apical Cysts. J Endod. 2009;35(5):607-15.

6. Bhaskar SN. Nonsurgical resolution of radicular cysts. Oral Surg Oral Med Oral Pathol. 1972 ;34(3):458-68.

7. Ten Cate AR. The epithelial cell rests of Malassez and the genesis of the dental cyst. Oral Surg Oral Med Oral Pathol. 1972;34(6):956-64.

8. Main DM. Epithelial jaw cysts: 10 years of WHO classification. J Oral Pathol. 1985;14(1):1-7.

9. Caliskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treat ment: A clinical review. Int Endod J. 2004; 37 (6): 408-16.

10. LM Lin, Domenico R, Jars hen L, PA Rosenberg. Nonsurgical Root Canal Therapy of Large Cyst-like Inflammatory Periapical Lesions and Inflammatory Apical Cysts. J Endod. 2009;35(5):607-15.

11. Bhaskar SN. Nonsurgical resolution of radicular cysts. Oral Surg Oral Med Oral Pathol. 1972 ;34(3):458-68.

12. Dwivedi S, Dwivedi CD, Chaturvedi TP, Baranwal HC. Management of a large radicular cyst: A non-surgical endodontic approach. Saudi Endodontic Journal. 2014 Sep 1;4(3):145.

13. Shanmugam D, Thanasekar V, Biradar N, Natarajan B, Dominic N. Conservative management of periapical cysts–A case series. Asian Journal of Medical Sciences. 2021 Jun 1;12(6):142-5.

14. Abu Zeid ST. Non-surgical management of periapical pathosis associated with sinus tract in one appointment using calcium hydroxide-based root canal sealer. Al Azhar Dent J. 1992; 7:321-333.

15. Malagnino VA, Amori P, Gambarini G, De Marco M. Recent findings in the mechanism of action of calcium hydroxide in apexification. G Stomatol Orto gnatodonzia1989; 8:14-7.

16. Siqueira JF Jr, Lopes HP. Mechanisms of antimicrobial activity of calcium hydroxide: A critical review. Int Endod J 1999; 32:361-9.

17. Al Ansary MA, Day PF, Duggal MS, Brunton PA. Interventions for treating traumatized necrotic immature permanent anterior teeth: Inducing a calcific barrier and root strengthening. Dent Traumatol 2009; 25:367-79.

18. Salamat K, Rezai RF. Nonsurgical treatment of extra oral lesions caused by necrotic nonvital tooth. Oral Surg Oral Med Oral Pathol 1986; 61:618-23.

19. Lin LM, Huang GT, Rosenberg PA. Proliferation of epithelial cell rests, formation of apical cysts, and regression of apical cysts after periapical wound healing. J Endod 2007; 33:908-16.

20. Nicholls E. 3rd ed. Endodontics. Bristol: John Wright Sons Ltd.,1984. p. 206.

21. Neaverth EJ. Decompression of large periapical cystic lesions. J Endod 1982; 8:175-82.

22. Walker TL, Davis MS. Treatment of large peri apical lesions using cannalization through involved teeth. J Endod 1984; 10:215-20.

23. Sjogren U, Haglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. J Endod 1990; 16:31-7.

24. Caliskan MK, Sen BH. Endodontic treatment of teeth with apical periodontitis using calcium hydroxide: A long-term study. Endod Dent Traumatol 1996; 12: 21 5-21.

25. Shah N. Nonsurgical management of periapical lesions: A prospective study. Oral Surg Oral Med Oral Pathol 1988; 66:365-71.

26. Murphy WK, Kaugars GE, Collet WK, Dodds RN. Healing of periapical radiolucencies after nonsurgical endodontic therapy. Oral Surg Oral Med Oral Pathol 1991; 71:620-4.

27. Schulz M, von Arx T, Alter Matt HJ, Boss Hardt D. Histology of periapical lesions obtained during apical surgery. J Endod 2009; 35:634-42.
28. Nat kin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence, and treatment of periapical cysts and granulomas. Oral Surg Oral Med Oral Pathol 1984; 57:82-94.
29. Eversole LR. Clinical outline of oral pathology: Diagnosis and treatment. 2nd ed. Philadelphia: Lea and Febiger; 1984. p. 203-59.