Case Report

University J Dent Scie 2025; Vol. 11, Issue 4

Non Surgical Management of An Immature Tooth With Biodentine Apexification – A Case Report.

Abstract:

An immature tooth with periapical lesion presents multiple challenges for effective disinfection and successful obturation.Even when the challenges described earlier are overcome the roots of these teeth are thin witha higher susceptibility to fracture .This case report describes the non surgical management of an immature non vital tooth associated with a periradicular lesion followed by single visit apexification using Biodentine.This also highlights the advantage of use of CBCT in accurate determination of the size and extent of periradicular lesions and also the scope of magnification using Operating microscope.

Key-words: Apexification, Biodentine, CBCT

Introduction:

Most periradicular lesions (>90%) can be classified as dental granuloma, radicular cyst, or abscess.[1] It is generally accepted that periradicular lesions cannot be differentially diagnosed as either radicular cysts or apical granulomas based on radiographic evidence alone.

There are two distinct categories of radicular cysts namely, those containing cavities completely enclosed by epithelial lining, true cysts, and those containing epithelial-lined cavities that are open to the root canals.[2,3] The latter was originally described as a 'bay cyst' and has been newly designated as a 'periapical pocket cyst' If the lesion is separate from the apex and with an intact epithelial lining (apical true cyst)., it may have developed into a self-perpetuating entity that may not heal when treated nonsurgically. On other occasions, a large periradicular lesion may have a direct communication with the root canal system (apical pocket cyst,) and respond favourably to nonsurgical treatment.[4]Some clinical studies have confirmed that simple nonsurgical treatment with proper infection control can promote healing of large lesions.[5]

Success rates of up to 85% have been reported after endodontic treatment of teeth with periapical lesions[6]. As it has been claimed that more than 40% of periapical lesions are radicular cysts, many of these lesions must be responding to root canal treatment.[7]

For an immature tooth the disinfection protocol should not include aggressive instrumentation, stimulating the formation of a hard tissue barrier or providing an artificial to allow optimal filling of the root canal . This case reportdescribes the non surgical management of an immature non vital tooth with cyst like periapical lesion followed by single visit apexification using Biodentine

[1]PRABATH SINGH V .P ., [2]SAPNA C M, [3]RAKESH R RAJAN, [4]ASHA JOSEPH, [5]ARJUN .B.RAVI, [6]ANJUVARUGHESE

[1-6]Department of Conservative Dentistry anEndodontics, Amrita School of Dentistry, Cochin, Kerala

Address for Correspondence: Dr. Prabath Singh V.P.
HOD
Amrita School of Dentistry Edapally
Ernakulam dist., Kerala, India
Email: drprabathendo@gmail.com

Received : 25 May., 2025, **Published :** 31 Dec, 2025

How to cite this article: V.P, P. S., C M, S., Rajan, R. R., Joseph, A., Ravi, A. .B, & Varughese, A. (2025). Non Surgical Management of An Immature Tooth With Biodentine Apexification – A Case Report. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 11(4).

Access this article online

Website: www.ujds.in

DOI: https://doi.org/10.21276/ujds.2025.11.4.11

Quick Response Code

Case Report:

A 15 year old boy reported to the Dept.of Conservative Dentistry and Endodontics, Amrita School of Dentistry, complaining of pain and swelling in relation to the palatal aspect of right maxillary anterior teeth. History revealed trauma to the maxillary anterior region 6 years ago.Medical history was non contributory. He gave history of occasional pain in the region since then which subsided on taking medications. Presently he was having pain and swelling since past 4 days.

On clinical examination Ellis class III fracture was seen on tooth 12 with associated palatal swelling of approximately 2cm x 2cm extending from 12 to 14 and to the midline. (Figure 1, 2)

Fig.1. Labial view of maxillary right lateral incisor (FDI #12)

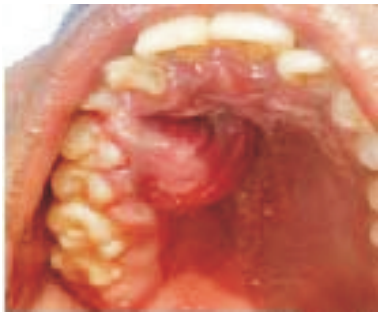


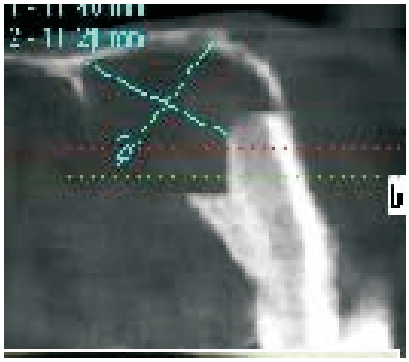
Fig.2 .Palatal view with obvious swelling

Radiographic examination revealed incomplete root formation in relation to 12 associated with well-defined periapical radiolucency and widening of periodontal ligament space of 13 and 11. (Figure 3)

Fig .3. Intraoral periapical radiograph of lateral incisor

Electric pulp testing and thermal testing was performed in which teeth 13 and 11 elicited a positive response while tooth 12 showed negative response

In order to make a more accurate assessment regarding the size and extent of the lesion, a CBCT evaluation was performed. In the CBCT image the size of the lesion size was measured to be 11.40mm x 11.21mm and perforation of the palatal plate was noted. (Figure 4, 5)



F ig.4.CBCT image of lateral incisor

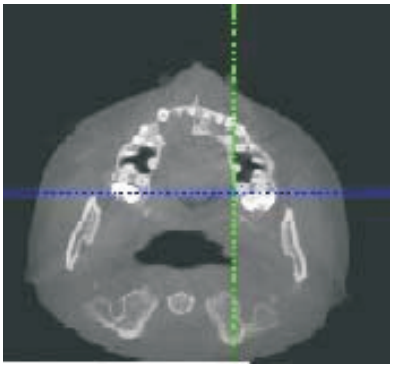


Fig.5. CBCT image -occlusal view

On the basis of clinical findings, radiographic examination, CBCT evaluation and pulp vitality testing, differential diagnosis of acute exacerbation of periapical granuloma and an infected radicular cyst were arrived at.

Endodontic therapy was initiated. Working length was established with an apex locator which was confirmed by IOPAR. (Figure 6) Since the radicular dentin thickness was minimal towards the apical region, minimal instrumentation was performed along with copious irrigation using 2% chlorhexidine and warm sodium hypochlorite (1%). A triple antibiotic closed dressing was given for one week. At the subsequent visit, the swelling had significantly reduced in size and also there was reduction in the severity of symptoms. Followed by irrigation using saline and 2% chlorhexidine a $Ca(OH)_2$ closed dressing was given for 2 weeks.

At the end of 3rd week after initiation of endodontic therapy, the patient had become completely asymptomatic and also the palatal swelling had completely subsided.

The following factors were considered which were in favour for a non surgical approach of the condition:

1. The lesion had responded significantly to the endodontic therapy initiated
2. Age of the patient was taken into account, since he was a young boy of 15 years, healing potential of the periapical tissues were probably high
3. Thickness of the radicular dentin was minimal, a periapical surgery would have further weakened the radicular dentin

Since the tooth was having a blunderbuss apex, an apical barrier had to be created for obturation of the radicular space. A single visit apexification was performed using Biodentine under magnification and was confirmed with Radiograph.(Figure7,8) Half an hour after biodentine apical plug was placed, obturation of the remaining space was done using thermoplasticized gutta percha.(Figure 9)and coronal restoration with composite .

Fig.6. Working length

Fig.7. Radiograph after placement of Biodentin

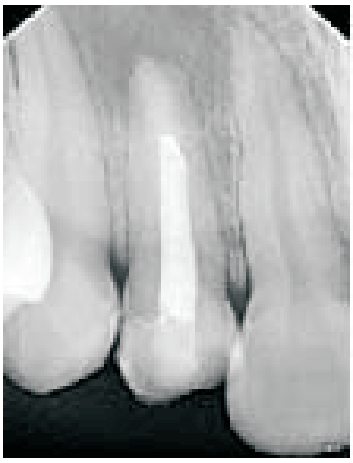


Fig .8 Post obturation radiograph

Fig.9. .Photograph of apical barrier position using microscope

The patient was recalled for montly reviews, where he was found to be completely asymptomatic. A CBCT evaluation at 6 months post op showed significant reduction in the size of the lesion. It was measured to be 6.9mm x 7.3mm (as compared to the initial size of 11.4mm x 11.2mm). Formation of the palatal bone plate could also be appreciated.(Figure 10, 11)

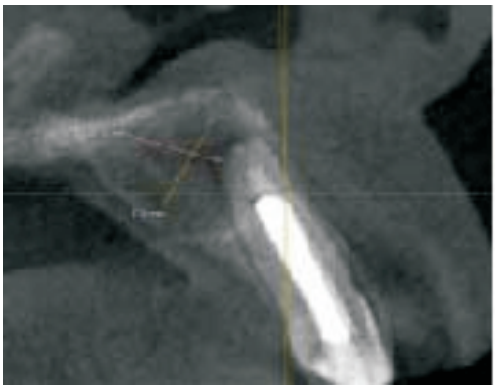


Fig .10.CBCT image of lateral incisor after 6 months

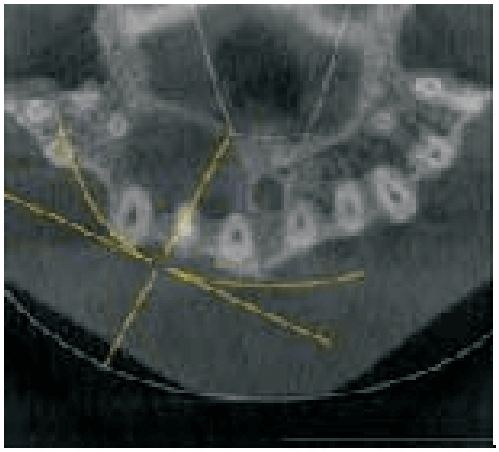


Fig.11.CBCT image after 6 months -occlusal view

CBCT evaluation and radiographic examination at 1 year post op revealed complete healing of the lesion with formation of trabecular bone pattern.(Figure 12)

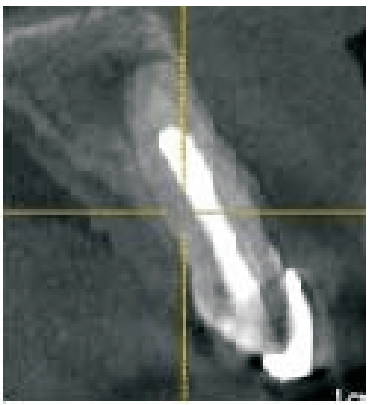


Fig.12.CBCT image of lateral incisor after one year

Palatal swelling was completely subsided and aesthetic restoration of tooth 12 in place respectively.

The patient is scheduled for further yearly follow up.

Discussion:

The definitive diagnosis of the type of periapical lesion can only be made by a histological examination. However, a preliminary clinical diagnosis of a periapical cyst is reasonable if all of the following conditions exist:

(i) the periapical lesion involves one or more teeth with necrotic pulps;
(ii) the lesion is greater than 200 mm^2 in size
(iii) a straw-coloured fluid is produced upon aspiration or on drainage through an access
(iv) the fluid contains cholesterol crystals [8]

The treatment options available to manage large cyst like lesions range from nonsurgical root canal treatment and/or apical surgery to extraction. In some instances, nonsurgical treatment may be ineffective or difficult; those cases may be treated by surgery. Drainage is important in the conservative management of large periapical lesions. When direct and immediate drainage is procured from localized swellings or abscesses or cysts, the symptoms are reduced. Systemic antibiotics are not indicated[9]

The exact mechanism by which periapical cysts heal is not clearly understood. According to Nair et al. (1996)[3] as the lumen of a 'bay' or 'pocket' cyst is open to the root canal it is likely to heal after conventional root canal treatment due to the removal of intracanal irritant. Because it is clinically and radiographically impossible to differentiate a bay cyst from a true cyst, as it is likewise between a cyst and granuloma, judicious treatment planning should favour a conservative approach to treatment[10]

In the present case, the lesion responded well to the endodontic therapy.. A non surgical line of management was chosen over surgery since the age of the patient was an advantageous factor and also the fact that surgery would have further weakened the radicular dentin. Revascularisation approach and calcium hydroxide apical barrier was also ruled out since the patient demanded a more rapid and definitive treatment option.

A single visit apexification was performed with Biodentine rather than MTA because Biodentine has an initial setting time of 6 mins and final setting time of 12 mins[11]as compared to 165±5 mins for MTA.[12]So obturation of the remainder of the radicular space could be performed at the same visit itself. Magnification using dental operating microscope (DOMS) enabled us to ensure a definitive apical seal. Obturation using thermoplasticised gutta percha was performed instead of lateral condensation to avoid weakening of radicular walls during lateral compaction.

Conclusion:

Basesd on our observation it was concluded that use of biodentin as an apical plug in necrotized teeth with open apex is a valuable option and may replace long term apexification ,thus reducing treatment time .Improved handling characteristics and faster setting time of biodentin compared to MTA is an added advantage in such cases .

References:

1. Bhaskar SN. Periapical lesions-types, incidence, and clinical features. Oral Surg Oral Med Oral Pathol 1966;21:657–71
2) Simon JH. Incidence of periapical cysts in relation to the root canal. J Endod. 1980 Nov;6(11):845-8. doi: 10.1016/S0099-2399(80)80039-2.
3) Ramachandran Nair PN, Pajarola G, Schroeder HE. Types and incidence of human periapical lesions obtained with extracted teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1996 Jan;81(1):93-102. doi: 10.1016/s1079-2104(96)80156-9.
4) Nair PN. New perspectives on radicular cysts: do they heal? Int Endod J. 1998 May;31(3):155-60. doi: 10.1046/j.1365-2591.1998.00146.x.
5) Calskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. Int Endod J 2004;37:408 –16
6) Calişkan MK, Sen BH. Endodontic treatment of teeth with apical periodontitis using calcium hydroxide: a long-term study. Endod Dent Traumatol. 1996 Oct;12(5):215-21. doi: 10.1111/j.1600-9657.1996.tb00518.x.
7) Bhaskar SN. Nonsurgical resolution of radicular cysts. Oral Surg Oral Med Oral Pathol. 1972 Sep;34(3):458-68. doi: 10.1016/0030-4220(72)90325-8.
8) Eversole (1984) in Clinical Outline of Oral Pathology: Diagnosis and Treatment. 2nd edn. Philadelphia: Lea & Febiger, pp. 203–259.
9) Dumsha TC, Gutmann JL (1988) Problems in managing endodontic emergencies. In: Gutmann IL, Dumsha TC, Lovdahl PE, eds. Problem Solving in Endodontics. Chicago, IL: Year Book Medical Publishers Inc., pp. 123–37.
10) Wood NK. Periapical lesions. Dent Clin North Am. 1984 Oct;28(4):725-66.
11) Septodont. Biodentine™ Active Biosilicate Technology. 2010. Available online: http://www.plandent.no/images/Marketing/Infosenter/Biodentine%20Scientific%20File_web_dokumentasjon. pdf (accessed on 15 January 2025).
12) Mahmoud Torabinejad and Masoud Parirokh. Mineral Trioxide Aggregate: A Comprehensive Literature Review—Part II: Leakage and Biocompatibility Investigations. J Endod 2010; 36:190–202.