



## Management Of A Large Periapical Cyst In The Maxilla Crossing The Midline

<sup>1</sup>Mun Mukherjee, <sup>2</sup>Vineet Nair, <sup>3</sup>Priyabrata Mandal

<sup>1</sup>Independent Researcher, <sup>2</sup>Associate Professor, <sup>3</sup>Assistant Professor,

<sup>2</sup>Dept. of Periodontia, Dr. R Ahmed Dental College and Hospital, Kolkata, India

<sup>3</sup>Dept. of Prosthodontia, Burdwan Dental College and Hospital, Burdwan

**\*Corresponding Author:**

**Dr. Vineet Nair**

Mrittika Apartment, 255, UB Road, Kolkata-700060, WB, India

Type of Publication: : Case Report

Conflicts of Interest: Nil

### Abstract

A periapical (radicular) cyst is the most common inflammatory odontogenic cyst and is detected at the apices of those teeth that are affected by pulpal necrosis. Most of the times, radicular cysts resemble the pre-existing chronic periapical periodontitis lesions radiographically. The following case report describes the management of a particularly large maxillary cyst (involving four anterior teeth and one posterior tooth) by surgical endodontic therapy and cystectomy followed by placement of alloplastic bone graft materials.

**Keywords:** Bone graft; Endodontic therapy; Periapical cyst, Periodontitis; Radicular cyst

### Introduction

Periapical or radicular cyst is the most common odontogenic cyst <sup>[1]</sup>. These are inflammatory jaw cysts affecting teeth with infected and necrotic pulp. It may develop rapidly from a periapical granuloma, as a consequence of untreated chronic periapical periodontitis <sup>[1]</sup>. Large periapical lesions are often associated with anterior maxillary teeth, probably due to traumatic injuries. Although the reported prevalence of cysts developing from apical periodontitis lesions varies from 6% to 55%, investigations based on meticulous serial sectioning and strict histopathologic criteria show that their actual prevalence is well below 20% <sup>[2]</sup>. Most radicular cysts develop slowly and do not become very large. Patients do not experience pain unless acute inflammatory exacerbation is present and the lesions are often detected only during routine radiographic examination. If the cyst does become large, symptoms such as swelling, mild sensitivity, tooth mobility and displacement may be observed. Clinically there will be cortical plate expansion during which the alveolar process have a paper like texture on palpation and the mucosa might display

bluish discoloration. The affected tooth is non-responsive to thermal and electrical pulp tests <sup>[3]</sup>. Diagnosis is confirmed after surgical biopsy of the lesion <sup>[4]</sup>.

The treatment plan includes complete elimination of the endodontic infection surgically or non-surgically, enucleation of the cyst and the optional placement of bone graft materials. This case report highlights the management protocol followed for one such case of a large periapical lesion in the maxilla that crossed the midline.

### Case report

A 34 years old male patient reported with the chief complaint of a large palatal swelling. The patient gave a history of trauma to his anterior teeth 20 years back. At that time, he did not seek any treatment for the same. On examination, a swelling (Fig. 1) was noted palatally extending from the right central incisor to the canine. Orthopantomogram and IOPA x-ray (Figs. 2a & b) revealed a large periapical radiolucency associated with teeth 22, 21, 11, 13 and 14. Clinical examination revealed palatal swelling over these teeth with the area being tender to

palpation and percussion. The provisional diagnosis was radicular cyst.

The patient's treatment plan was decided in the following manner-endodontic treatment along with apicoectomy of the teeth followed by surgical enucleation of the cyst with subsequent filling of the large defect with allograft. A palatal cover plate (Fig. 3) was prepared as it would be required post-surgery to prevent the displacement of the maxillary segment.

Under local anaesthesia, a full thickness mucoperiosteal flap was raised (Fig. 4). After osteotomy and thorough curettage, the defect was filled with alloplastic bone graft material (Figs. 5- 7). The flap was apposed to its original position and sutured (Fig. 8) and the patient was discharged after giving post-operative instructions. The patient was called after one month and at four months for post-operative follow up (Figs. 9-10).

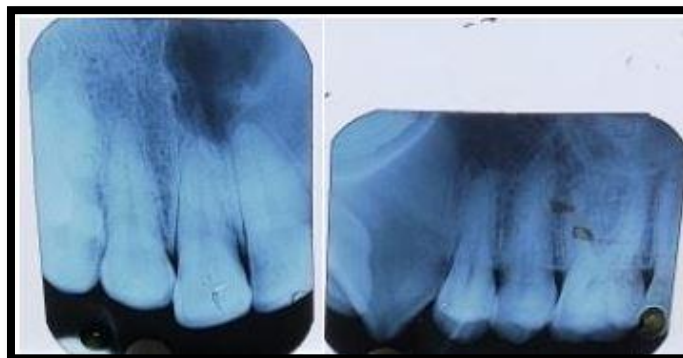
**Fig.1- Swelling noted in the palate**



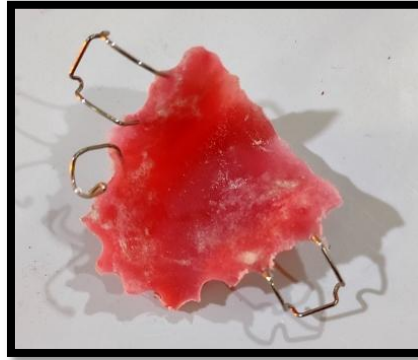
**Fig.2a- Orthopantomogram.**



**Fig.2b- IOPA x-ray**



**Fig.3- Palatal cover plate**



**Fig.4- Full thickness muco-periosteal flap was raised**



**Fig.5- Alloplastic bone material**



**Fig.6- View after thorough curettage**



**Fig.7- View after placement of bone graft material**



**Fig.8- View after suturing.**



**Fig.9- One month post-operative clinical and radiographical view****Fig.10- Post-operative radiographic view (4 months)**

## Discussion

Periapical cyst is the most frequently found inflammatory cyst [5]. Pulp necrosis leading to periapical inflammation appears to be the most common etiology of periapical cyst [6]. However, it usually goes unnoticed, rarely exceeds the palpable size and is found accidentally after a radiological examination. In the specialized literature, most cases of periapical cysts have been described in the anterior area of the upper jaw [7, 8]. Some of the possible reasons for such cysts to develop in the maxilla could be the spongy structure of maxillary bone and the reluctance to extract the anterior teeth which leads to prolonged presence of these diseased teeth in the arch and finally cyst formation.

The approach to such cystic lesions could be both surgical and non-surgical. Some authors believe that after the elimination of the endodontic infection, the immune system encourages repair and the lesion might regress by the mechanism of apoptosis analogous to the resolution of inflammatory apical pocket cysts. Hence the surgical intervention needed to remove the cystic epithelium can be avoided [9, 10]. However, in some cases, additional complementary

techniques like surgical intervention in the form of apicoectomy are indicated to provide more favourable decontamination [11]. Apicoectomy is the removal of approximately 3 mm of root apex which has ramifications and lateral canals. Mostly, these areas cannot be managed through non-surgical endodontic retreatment and in such situations endodontic surgery appears to offer more success [12].

The treatment procedures available for cysts have evoked the greatest debates and controversies because of the size, localization, pathological formation and recurrence potential of the cysts [13]. The best modality chosen should carry the lowest possible risk of recurrence and minimum morbidity. Management options can be either conservative treatment or radical management [14]. Conservative treatment attempts to preserve the bony architecture as much as possible while removing the pathology as in marsupialization or decompression. More aggressive forms of management are enucleation with/without curettage along with adjunctive uses of chemical/cryocauterization or resection. In our case, we decided to enucleate the cyst as we believe enucleation has been the most effective and reliable method to treat cysts. It completely removes the

cystic capsule, thus reducing the possibility of recurrence<sup>[15]</sup>.

Periapical surgery includes removal of damaged tissue and sometimes the application of different graft materials to enhance new bone formation at the residual defect site. Bone formation following periapical surgery can be accelerated by placing bone graft into the bony defect<sup>[16, 17]</sup>. The ideal bone graft material should be biologically inert, not carcinogenic, is easily manoeuvrable to fit the osseous defect and should be structurally stable. It should serve as a base for new bone formation and slowly resorb to permit replacement by new bone<sup>[18]</sup>. Various types of bone grafts are available including autografts, allografts, xenografts and alloplasts<sup>[19]</sup>. The use of non-autogenous bone grafts for the treatment of intrabony defects has gained acceptance among clinicians, as it eliminates the need for intra-or extraoral bone graft donor sites<sup>[20]</sup>. Several alloplastic materials are available today and Novabone, one such graft material has been used in our study.

The biologic mechanisms that provide a rationale for bone grafting are osteoconduction, osteoinduction and osteogenesis<sup>[21]</sup>. NovaBone Putty – CMF is a bioactive synthetic graft with osteostimulative and osteoconductive property, manufactured by NovaBone, Florida, available in putty consistency. It consists of two particle phases: Phase 1 -90-710 µ bioactive glass particles and Phase 2 - 32-125 µ calcium phosphosilicate. Phase 2 particles enhance the physical characteristics and improve handling. Its putty consistency makes it easy to manipulate and adapts well to defects. Spaces between the particles permit rapid vascularization and bone ingrowth. Bone forms in several areas in the defect simultaneously, thus enhancing the regeneration<sup>[22]</sup>.

## Conclusion

Endodontic treatment coupled with a surgical approach (apicoectomy) performed with bone graft placement in the ensuing defect proved to be a successful approach in the resolution of a large, persistent peri-radicular bony defect in the maxilla.

## References

1. Menditti, Dardo; Laino, Luigi; Di Domenico, Marina; Troiano, Giuseppe; Guglielmotti, Mario; Sava, Sara; Mezzogiorno, Antonio; Baldi,

Alfonso. "Cysts and Pseudocysts of the Oral Cavity: Revision of the Literature and a New Proposed Classification". *In Vivo*. 2018;32(5):999–1007.

2. Nair PN, Sundqvist G, Sjögren U. Experimental evidence supports the abscess theory of development of radicular cysts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2008;106(2):294-303. Epub 2008 Jun 13.
3. Lin LM, Ricucci D, Lin J, Rosenberg PA. Nonsurgical root canal therapy of large cyst-like inflammatory periapical lesions and inflammatory apical cysts. *J Endod*. 2009;35(5):607-15.
4. Marquis VL, Dao T, Farzaneh M, Abitbol S, Friedman S. Treatment outcome in endodontics: the Toronto study—phase III: initial treatment. *J Endod*. 2006;32(4):299–306.
5. Fernandes M, Ataide I de. Nonsurgical management of periapical lesions. *J Conserv Dent*. 2010;13(4):240-5.
6. Nair PNR. New perspectives on radicular cysts: do they heal? *International Endodontic Journal*. 1998; 31(3):155–160.
7. Sharifian MJ, Kalili M. Odontogenic cysts: A retrospective study of 1227 cases in an Iranian Population from 1987 to 2007. *J. Oral Sci*. 2011;53(3):361-7.
8. Silvia T, Emanuele A, Maria FM, Maria LB, Francesco B, Francesco V. Prevalence and distribution of odontogenic cysts in Sicily: 1968-2005. *J. Oral Science* 2008; 50(1):15-8.
9. 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(8):908-16.
10. Caliskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: A clinical review. *Int Endod J*. 2004;37(6):408-16.
11. Chércoles-Ruiz A, Sánchez-Torres A, Gay-Escoda C. "Endodontics, endodontic retreatment and apical surgery versus tooth extraction and implant placement: a systematic review," *Journal of Endodontics*, 2017;43(5):679-86.

12. Torabinejad M, Corr R, Handysides R, Shabahang S. Outcomes of nonsurgical retreatment and endodontic surgery: A systematic review. *J Endod* 2009;35:930-7.
13. Chhabra N, Chhabra S, Kumar A. Cyst Enucleation Revisited: A New Technical Modification to Ensure Complete Removal of Cystic Lining. *J Maxillofac Oral Surg*. 2020;19(2):173–7.
14. Danin J, Linder LE, Lundqvist G, Ohlsson L, Ramsköld LO, Strömberg T. Outcomes of periradicular surgery in cases with apical pathosis and untreated canals, *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics*. 1999; 87(2):227–32.
15. Kandhari A, Shenoi P. Surgical enucleation of radicular cyst using operating microscope: a case report & overview on use of microscope. *Secr Message*. 2009;4:64.
16. Saad AY, Abdellatief EM. Healing assessment of osseous defects of periapical lesions associated with failed endodontically treated teeth with use of freeze-dried bone allograft. *Oral Surg Oral Med Oral Pathol* 1991;71:612-7.
17. Lalabonova H, Daskalov H. Jaw cysts and guided bone regeneration (a late complication after enucleation). *J Int Med Assoc Bulg Annu Proc (Sci Pap)* 2013;19:401-3.
18. Jansson L, Ehnevid H, Lindskog S, Blomlöf L. Development of periapical lesions. *Swed Dent J* 1993;17:85-93.
19. Laurencin C, Khan Y, El-Amin SF. Bone graft substitutes. *Expert Rev Med Devices*. 2006;3:49–57.
20. Nevins ML, Camelo M, Lynch SE, Schenk RK, Nevins M. Evaluation of periodontal regeneration following grafting intrabony defects with Bio-Oss collagen: a human histologic report. *Int J Periodontics Restorative Dent*. 2003;23(1):9–17.
21. Giannoudis PV, Dinopoulos H, Tsiridis E. Bone substitutes: An update. *Injury*. 2005;36(Suppl 3):S20–7.
22. Bembi NN, Bembi S, Mago J, Baweja GK, Baweja PS. Comparative Evaluation of Bioactive Synthetic NovaBone Putty and Calcified Algae-derived Porous Hydroxyapatite Bone Grafts for the Treatment of Intrabony Defects. *Int J Clin Pediatr Dent*. 2016;9(4):285-90.