

# PREDICTABLE BONE FILL; A FIVE YEAR FOLLOW UP OF PERIRADICULAR SURGERY: CASE REPORT



Fauzia Quadir<sup>1</sup>

BDS, FCPS

Yawar Ali Abidi<sup>2</sup>

BDS, FCPS

Shahbaz Ahmed<sup>3</sup>

BDS, MSc, FCPS

Sofia Ali Syed<sup>4</sup>

BDS M Phil

The goal of periradicular surgery is to eliminate the periradicular inflammatory tissues and seal the apical foramen to create optimum conditions for healing through the regeneration of tissues, including the formation of a new attachment apparatus which is achieved by thorough curettage of the lesion. It includes removal of the pathological periradicular tissues for visibility and accessibility to facilitate the treatment of the apical root canal system, or sometimes for the removal of harmful foreign materials present in the periradicular area. This case report describes the non-surgical and surgical endodontic treatment of a large cyst-like periradicular lesion in a 22-year-old male patient in the left maxillary anterior region. Conservative root canal treatment was carried out for the non-vital teeth, followed by peri-radicular surgery. The clinical and radiographic examinations after a five- year follow up period revealed complete periradicular healing. The appropriate diagnosis of periradicular lesions and the treatment of infected root canal systems allowed complete healing of these large lesions with endodontic surgery.

**KEY WORDS:** Periradicular surgery, Root canal treatment, Healing, Cyst, Curettage.

**HOW TO CITE:** Quadir F, Abidi YA, Ahmed A. Predictable Bone Fill; A Five Year Follow Up Of Periradicular Surgery: Case Report. J Pak Dent Assoc 2014; 23(1):36-40

## INTRODUCTION

Jaw cysts are broadly divided into odontogenic and non odontogenic cysts. Odontogenic cysts are classified into inflammatory and developmental cysts<sup>1</sup>. Radicular cyst is the most common inflammatory odontogenic cyst. Approximately 60 % of all jaw cysts are radicular cysts<sup>2</sup>. These cysts can occur in periapical area of any tooth (radicular cyst) or lateral aspect of roots with respect to accessory lateral canals (lateral radicular cyst) or at previous tooth extraction site (residual cyst) at any age but are rarely seen in deciduous teeth<sup>3,4</sup>. They develop as a subsequence of dental caries and tooth trauma following pulp necrosis and periapical infection<sup>5</sup>. They derive their epithelial lining from proliferation of epithelial cell rests of Malassez within periodontal ligament. The pathogenesis of cysts has been described in three phases<sup>6</sup>. Initially, the rests of Malassez begin to proliferate due to inflammatory products, bacterial

antigens and the epidermal growth factors, followed by formation of a lumen due to necrosis of central epithelium and enlargement of cyst by increased osmotic pressure<sup>7,8</sup>.

Radiographically, the radicular cyst resembles periapical granuloma and appears as a single, small or large round to oval or pear-shaped radiolucencies around the apex of affected tooth or lateral aspect of root or within the alveolar ridge at the site of extracted tooth. Loss of lamina dura and root resorption is frequently seen in radicular and lateral radicular cysts<sup>9</sup>.

The histopathologic features of all three cysts are same. The cyst is lined by non-keratinized stratified squamous epithelium of variable thickness. Transmigration of inflammatory infiltrate with large number of neutrophils and few lymphocytes through epithelium is common. Amongst plasma cells, spherical intracellular accumulations of gamma globulin known as Russel bodies are often present. Dystrophic calcification, cholesterol clefts, areas of hemosiderin pigmentation, foreign body type-multinucleated giant cells may be present in lumen, wall or both. The lumen contains proteinaceous fluid and cellular debris<sup>10,11,12,13</sup>.

The treatment modalities for radicular cysts are

1. Assistant Professor Department of Operative Dentistry Dow Dental College, Karachi.

2. Professor and Head Department of Operative Dentistry Dr. Ishrat ul Ebad Khan Institute of Oral Health Sciences, Karachi.

3. Assistant Professor Department of Operative Dentistry Dr. Ishrat ul Ebad Khan Institute of Oral Health Sciences, Karachi.

4. Assistant Professor Department of Oral Pathology Dow Dental College, Karachi

Corresponding author: "Dr.Fauzia Quadir" < fzb80@hotmail.com >

surgical endodontic treatment, extraction of tooth, enucleation with primary closure, and marsupialization followed by enucleation<sup>14</sup>.

Investigations<sup>15,16,17</sup> have shown that large periradicular lesions may not respond positively to nonsurgical endodontic treatment, which is the first line of action, and periradicular surgery is usually the treatment of choice. However, the general consensus is that bacterial elimination from the root canal system by effective biomechanical preparation will lead to more successful outcomes<sup>18</sup>.

The following case report describes a large cyst-like periradicular lesion which was treated with the combination of non-surgical and surgical endodontic treatment, resulting in a predictable periradicular healing.

### CASE REPORT

A 22 year old male patient presented to the Operative Department of Fatima Jinnah Dental Hospital, Karachi, in November 2005, complaining of dull throbbing pain in his maxillary anterior teeth for the last four days. The medical history was not significant although he did give a history of childhood trauma to his maxillary front teeth. On clinical examination, extraoral diffused swelling was seen on his right molar region. Intraorally, there was a complicated fracture of left central incisor. There was a large swelling palatally, extending from the right central incisor to the first molar region. It was also discoloured and tender to percussion (Fig 1). The vitality test was



Fig. No. 1

done using an electric pulp tester (Dentsply USA) and negative results were obtained for upper left central incisor, upper left lateral incisor and upper left canine. On periapical radiographic evaluation, there was periapical radiolucency involving the roots of upper left

central and lateral incisors and upper left canine (Fig 2).

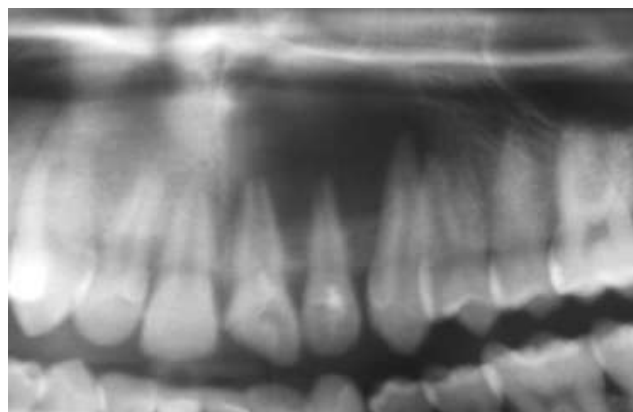


Fig. No. 2

The radiograph could show the entire extent of the lesion very well, therefore no other intra-oral view was ordered. However, an OPG was taken to have a broader picture of the lesion with respect to other structures. A treatment plan was formulated and endodontic treatment of the non-vital tooth was done. In the first visit root canal treatment was initiated. Profound anaesthesia was given. Rubber dam was applied. The pulp chambers were opened with 0.04 round burs (Mani). Cleaning and shaping was done using a crown-down technique using 5.25% sodium hypochlorite as an irrigant. Pulpectomy was completed in all the three teeth simultaneously. The teeth were dried with sterile paper points and then filled with an intracanal dressing of calcium hydroxide (Calcpulp, Septodont) up to their apices. The access cavities were sealed temporarily with Light-Cure Glass-ionomer (Vitremer, 3M) and the patient was recalled after one week. The patient did not appear on the second visit. However in 2007, the patient reappeared with a huge bluish fluctuant palatal swelling measuring 3x3cm in his anterior segment (Fig 3). There was a discharging

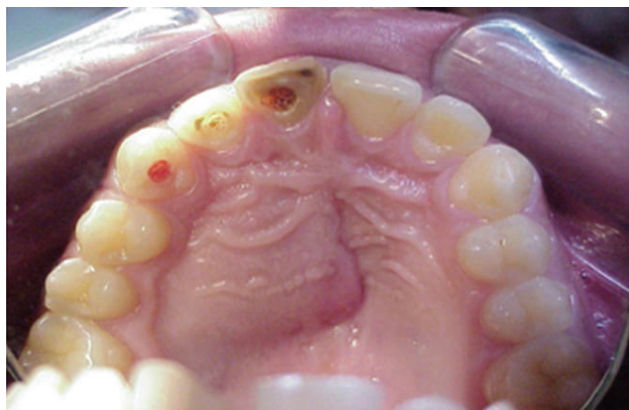


Fig. No. 3

sinus in the labial sulcus related to the apex of upper left central incisor. An OPG and periapical radiograph was taken. On radiographic evaluation, a much larger radiolucency was seen as compared to the previous radiograph, involving the roots of upper left central incisor, upper left lateral incisor and upper left canine. The pathology appeared as a radicular cyst causing slight resorption of the root of the upper left maxillary central incisor. After discussion with the patient, it was planned that the root canal treatment of these teeth will be completed followed by periradicular surgery. Root canal treatment was completed (Fig 4) after a 3 weeks phase

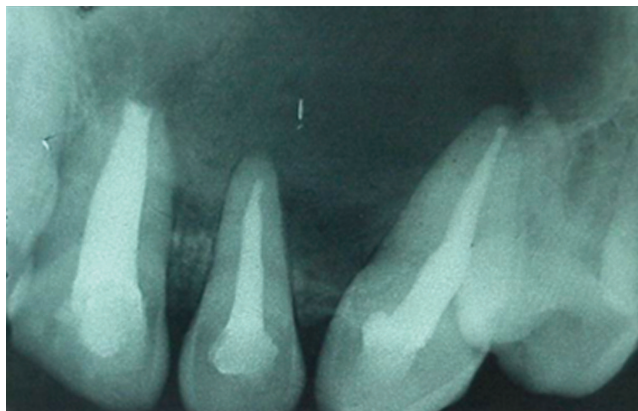


Fig. No. 4

of intracanal dressing of calcium hydroxide (Calciulp, Septodont). Obturation was done using cold lateral condensation method and corebuildup was done with composite, which was followed by the periradicular surgery. The surgery was carried out under effective local anaesthesia. A four cornered envelope flap extending from right upper central incisor to left upper first premolar



Fig. No. 5

with releasing incisions was given to visualize the field. The lesion was found to have caused significant resorption of the buccal cortical plate and the root of upper right central incisor. Complete curettage of the lesion was

ensured. The cavity was dried and apicectomy of the roots of the involved teeth was done followed by retrograde filling with Kalzinol (De Trey, Dentsply) (Fig 5). The flap was repositioned and sutured. Part of the excised tissue was sent to the lab for histopathological examination, the report of which confirmed it to be a radicular cyst.

The patient was given post-operative instructions and was re-called after one week for the removal of the sutures and an initial follow up. After three months, the teeth were given individual porcelain fused to metal (PFM) crowns to restore the aesthetics (Fig 6). The



Fig. No. 6

patient was kept on a regular periodic follow up. Last radiograph was taken five years after the treatment (Fig 7). The periapical radiograph and OPG revealed



Fig. No. 7

constant regression of the periapical radiolucency which almost completely disappeared. There was appreciable



bone fill in the area during this five year period.

## DISCUSSION

The prognosis of periradicular surgery improves with decreasing periradicular lesion size and lesser apical resection<sup>19</sup>. Studies on the outcome of periradicular surgery have reported variable results, ranging from a 30-80% success rate<sup>20</sup>. However, these studies differed in sample size, type of teeth, surgical technique, type of root end filling materials and radiographic evaluation criteria. Recently, some longitudinal studies reported a higher success rate in periradicular surgery of teeth not responding to orthograde endodontic treatment<sup>21</sup>. Similarly modern surgical endodontic procedures are associated with a success rate of 92.5%<sup>22</sup>.

The 'apical seal' has long been considered paramount to the success of periradicular surgery<sup>23</sup>. Many materials have been used for apical sealing including reinforced zinc oxide-eugenol cement (Kalzinol) which has been used in this case. The material has a favorable tissue response when compared to amalgam<sup>23</sup>. There are other factors apart from the sealing ability of the material that influence the outcome or healing of the periradicular surgery which include differences between individuals in term of their ability to fight infection, age, medical status<sup>24</sup>. The patient in this case report was young and had no medical history and showed a promising periradicular healing. Jansson reported a poorer prognosis for larger periapical lesions<sup>25</sup>.

However, Grung found no relationship between lesion size and prognosis, which is very evident in the presented case report<sup>26</sup>.

There are a few criteria set to assess the healing or success of the periradicular surgery which take into account important aspects of healing like bone regeneration, periodontal ligament formation and clinical scale like pain and swelling. According to the criteria reported by VonArx and Kurt<sup>27</sup>, the presented case attains the criteria of success and complete healing respectively. A five year radiographic comparison (Fig 7) of this case report shows complete bone healing and periodontal ligament attachment formation.

## CONCLUSION

It proved from this case report that periradicular surgery is treatment of choice in cases unresponsive to

orthograde endodontic treatment and with large cyst like lesions of endodontic origin.

## REFERENCES

1. Barnes L, Eveson JW, Reichart P. editors: World Health Organization classification of tumours: pathology and genetics of head and neck tumours, Lyon, France, 2005, IARC Press. pp 306-307.
2. Jones A, Craig G, Franklin C. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. *J Oral Pathol Med.* 2006;35:500-507.
3. Grewal HK, Batra R. Non syndromic bilateral dentigerous cysts - a case report. *Int J Dent Clin.* 2010;2:49-51.
4. Bhaskar SN: Periapical lesions-types, incidence, and clinical features, *Oral Surg Oral Med Oral Pathol* 1966; 21:657-71.
5. Joshi UK, Patil SK, Siddiqua A. Nasopalatine cyst a rare entity. *Int J Dent Clin.* 2010;2:34-36.
6. Shear M. Cysts of the oral regions. 3rd edn. Oxford: Wright; 1992
7. Jansson L, Ehnevid H, Lindskog S, Blomlöf L. Development of periapical lesions. *Swed Dent J.* 1993;17:85-93.
8. Nair PNR. Non-microbial etiology: foreign body reaction maintaining post-treatment apical periodontitis. *Endod Topics* 2003;6:114-34
9. Sapp JP, Eversole LR, Wysocki GP. Contemporary Oral Pathology. 2<sup>nd</sup> edn. Mosby; 2004.
10. Regezi JA, Sciubba JJ, Jordan RCK. Oral Pathology: Clinical Pathologic Correlations. 6<sup>th</sup> edn. Elsevier Saunders; 2012.
11. Damm D.D, Bouquot JE, Neville BW, Damm DD, Carl Allen C. Oral and Maxillofacial Pathology. 3rd edn. Elsevier Saunders; 2008.
12. Browne RM. Cysts-Investigative pathology of odontogenic cysts CRC press. Boca Raton. 1991.
13. Schulz M, von Arx T, Altermatt HJ, Bosshardt D. Histology of periapical lesions obtained during apical surgery. *J Endod.* 2009;35:634-42.
14. Joshi.N, Sujana.S, Rachappa.M . An unusual case report of bilateral mandibular radicular cysts. *Contemp Clin Dent.* 2011;2:59-62.
15. Ozan U, Er K. Endodontic treatment of a large cyst-like periradicular lesion using a combination of antibiotic drugs: a case report. *J Endod* 2005; 31: 898-900.

16. Oztan MD. Endodontic treatment of teeth associated with a large periapical lesion. *Int Endod J* 2002; 35: 73-78.
17. Cali'skan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. *Int Endod J* 2004; 37:408-16.
18. Broon NJ, Bortoluzzi EA, Bramante CM. Repair of large periapical radiolucent lesions of endodontic origin without surgical treatment. *Aust Endod J* 2007; 33: 36-41.
19. Pearrocha M, Mart E, Garca B, Gay C. Relationship of periapical lesion radiologic size, apical resection, and retrograde filling with the prognosis of periapical surgery. *J Oral Maxillofac Surg.* 2007;65: 1526-1529.
20. Friedman S, Lustmann J, Shaharabany V. Treatment results of apical surgery in premolar and molar teeth. *J Endod* 1991; 17: 30-33.
21. Zuolo ML, Ferreira MO, Gutmann JL. Prognosis in periradicular surgery: a clinical prospective study. *Int Endod J* 2000; 33: 91-98.
22. Maddalone M, Gagliani M. Periapical endodontic surgery: a 3-year follow-up study. *Int Endod J.* 2003; 36: 193-198.
23. Chong BS, Pitt Ford TR, Kariyawasam SP. Short-term tissue response to potential root-end filling materials in infected root canals. *Int Endod J.* 1997; 30:240-249.
24. Chong BS, Pitt Ford AR. Root-end filling materials: rationale and tissue response *Endodontic Topics* 2005;11:114–130.
25. Jansson L, Sandstedt P, Låftman A-C. Relationship between apical and marginal healing in periradicular surgery. *Oral Surg Oral Med Oral Pathol* 1997; 83: 596.
26. Grung B, Molven O, Halse A: Periapical surgery in a Norwegian County Hospital: Follow-up findings of 447 teeth. *J Endod* 1990;16: 391.
27. Von Arx T, Kurt B. Root-end cavity preparation after apicoectomy using a new type of sonic and diamond-surfaced retrotip: a 1 year follow-up study. *J Oral Maxillofac Surg* 1999; 57: 656-661.