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## **Surgical and supportive management of radicular cyst with palatal perforation: A case report**

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### **Abstract**

The radicular cyst is the most common odontogenic cyst encountered in a dental clinic. It is the usual but not inevitable sequelae of the periapical granuloma originating as a result of bacterial infection and necrosis of the dental pulp, nearly always following carious involvement of the tooth. This case report deals with radicular cyst with palatal perforation in fourteen year old adolescent associated with maxillary left central incisor, lateral incisor, canine, first premolar and second premolar that was successfully managed with single sitting Root Canal Therapy (RCT) along with surgical enucleation of the cyst and placement of removable Hawley's appliance for the support of the palatal plate.

**Keywords:** radicular cyst, enucleation, palatal perforation, Hawley's appliance

### **1. Introduction**

A cyst is a pathological cavity usually lined by epithelium, filled with fluid or semifluid material or sometimes air. The usual etiology of radicular cyst is an infected tooth, leading to necrosis of the pulp. Toxins exit at the apex of the tooth which leads to periapical inflammation. This inflammation further stimulates the epithelial cell rests of malassez, which are present in the apical periodontal ligament, resulting in the formation of a periapical granuloma. Eventually, this epithelium undergoes necrosis caused by a lack of blood supply and a granuloma becomes a cyst (radicular cyst). Radicular cyst is also known as periapical cyst, periodontal cyst, root end cyst or dental cyst [1].

Management of cyst can be done by surgical or non-surgical method; either by marsupialization or enucleation, depending on the size and location of the lesion, the bone integrity of the cystic wall and its proximity to vital structures [2]. It was also reported that periapical cyst has high incidence in the maxillary anterior region, may be as a result of trauma [3]. This case report presents a case of surgical management of a radicular cyst extending from 21 to 25 in a 14 year old adolescent.

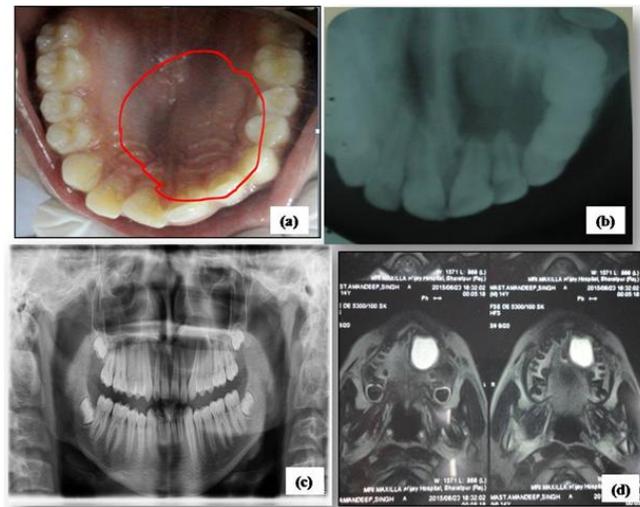
### **2. Case report**

A 14 year old male reported to the Department of Pedodontics and Preventive Dentistry, K. D. Dental College and Hospital, Mathura, India, with a complaint of large swelling in the left palatal region since one month. Past dental history revealed trauma two years before in maxillary anterior region for which no treatment was sought. Post trauma he had dull intermittent pain in relation to the maxillary anteriors which subsided without medication.

During examination, he was found to be in good general and physical health. On intraoral examination, Ellis class I fracture of 21 with palatal swelling in the left maxillary region from 21 to 25 was present (Fig. 1a). Electric pulp vitality test gave a negative response in relation to maxillary left central, lateral incisor and canine.

#### **2.1. Investigation**

Maxillary occlusal radiograph revealed well-circumscribed periapical radiolucency, about 3.0 x 2.0 cm in dimension, extending from mesial aspect of root apex of left maxillary central incisor to distal aspect of left maxillary second premolar, suggesting the size of the cyst (Fig. 1b). O.P.G. revealed, a single well defined radiolucency lesion with respect to periapical region of 21 to 25. Internal structure is totally radiolucent. No evidence of root resorption of the involved teeth present (Fig. 1c). M.R.I. was also done for confirmation of the cystic lesion (Fig. 1d)



**Fig 1:** Preoperative photographs: (a) Maxillary occlusal view of the cystic lesion, (b) Radiographic maxillary occlusal view of the cystic lesion, (c) O.P.G. view of the cystic lesion, (d) M.R.I. of the cystic lesion.

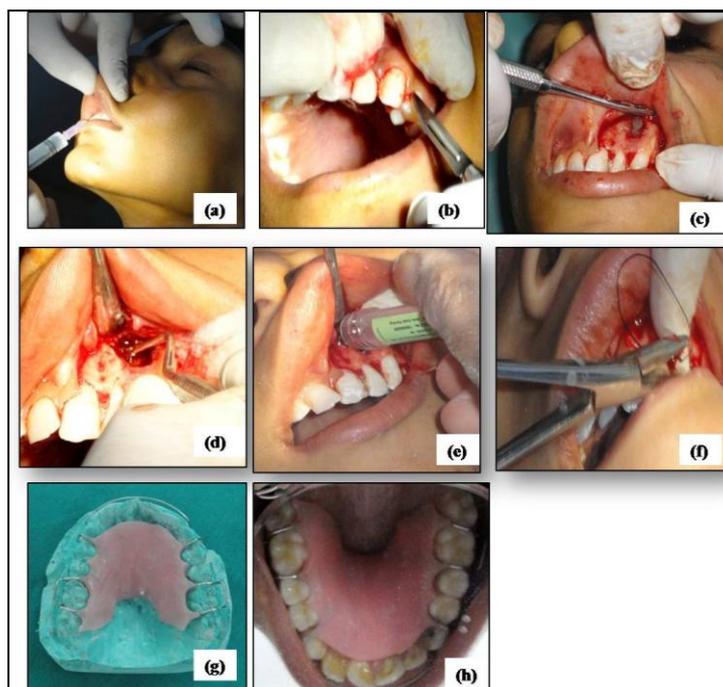
**3. Clinical procedure**

Based on the history and clinical examination, a provisional diagnosis of Ellis class I fracture of maxillary left central incisor was made, but, after electric pulp vitality test and radiological examination, a final diagnosis of Ellis class IV fracture of 21, 22 and 23 was made associated with cyst involving root apex from 21 to 25 but the final call for type of cyst was left to histopathologic report. Treatment plan was comprised of RCT of left central incisor, lateral incisor and canine with cyst enucleation. With the consent of the parents and patient, the endodontic therapy of 21 to 23 was carried out followed by cyst enucleation procedure.

**3.1. Cyst Enucleation Procedure**

Before starting the procedure a brief informed consent was taken from the parent. Under all aseptic conditions lignocaine with 2% adrenaline was injected to anaesthetize the operating site by giving bilateral infraorbital nerve block and

nasopalatine nerve block (Fig. 2a). Crevicular incision and two releasing vertical incision was placed on labial aspect extending from left maxillary central incisor to left maxillary first premolar to reflect full thickness mucoperiosteal flap that exposed a wide labial bone defect (Fig. 2b, 2c). Cyst lining was excavated with an angled curette (Curved Periodontal Curette # 99 – 783, API Germany Stainless steel instrument, New Delhi, India) along with its content followed by thorough curettage and irrigation done by normal saline (Fig. 2d). Bone graft (Biograft HA, Granule size: 250 – 350 µm. manufactured by Refractories Ltd., India) placement was done (Fig. 2e). Flap closure was done using 3-0 silk suture (Fig. 2f). The specimen was sent for histopathological examination. After three days, patient was recalled for follow up and for the placement of simple Hawley’s appliance. After a week, patient was again recalled for the removal of sutures (Fig. 2g, 2h).



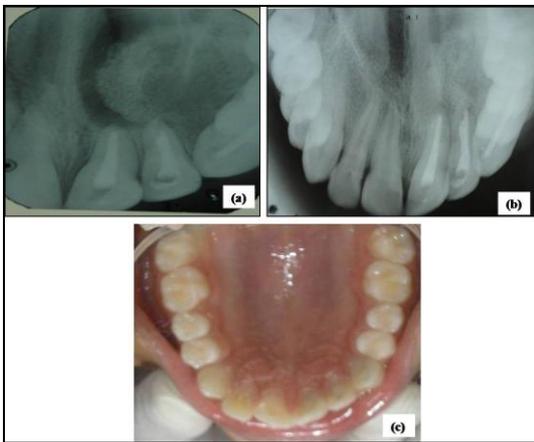
**Fig 2:** Clinical procedure: (a) Local anaesthesia administered, (b) Crevicular incision given, (c) Flap raised, (d) Cyst enucleation done, (e) Bone graft placed, (f) Suturing done, (g) Simple Hawley’s appliance was fabricated, (h) Maxillary occlusal view after insertion of simple Hawley’s appliance.

When cyst was enucleated there was a large perforation on the palate. Enucleated cyst was greyish white in colour and soft to firm in consistency (Fig. 3).



**Fig 3:** Enucleated cyst

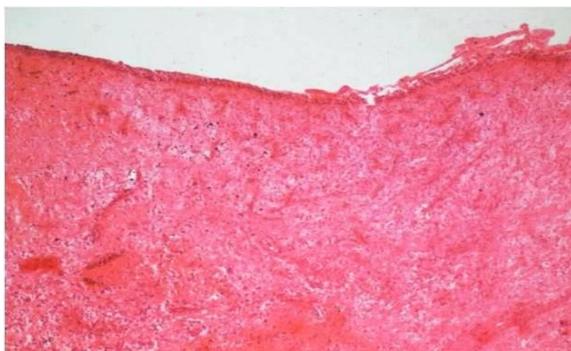
Postoperatively, intraoral periapical radiograph after 6 months revealed regression of the cystic lesion (Fig. 4a) and Maxillary occlusal radiograph after one year (Fig. 4b) revealed formation of bony trabaculae.



**Fig 4:** Postoperative photographs: (a) Intraoral Periapical Radiograph (IOPAR) view after 6 months, (b) Maxillary occlusal radiograph after 1 year, (c) Intraoral maxillary occlusal view after 1 year

### 3.2. Histopathological report

Showed cystic lumen lined by stratified squamous epithelium supported by connective tissue capsule. The lining epithelium is thin, discontinuous and absent in many areas. The overlying connective tissue capsule consists of dense bundles of collagen fibres interspersed with fibroblasts, endothelial lined blood vessels, dense inflammatory cell infiltrates chiefly consists of lymphocytes, plasma cells and extravasated red blood cells (Fig. 5).



**Fig 5:** Histopathologic picture

### 4. Discussion

Radicular cyst usually originates from epithelial cell rests of malassez in periodontal ligament as a result of inflammation due to pulp necrosis or trauma [4]. The radicular cyst is the most common odontogenic cyst (52.3-70.7 percent of all odontogenic cysts) followed by the dentigerous cyst (16.6-21.3 percent of all odontogenic cysts) and odontogenic keratocyst (5.4- 17.4 percent of all odontogenic cysts) [5].

Pathogenesis of radicular cyst has comprised of three distinct phases: the phase of initiation, the phase of cyst formation and the phase of enlargement<sup>6</sup>. Radicular cysts are usually asymptomatic and are left unnoticed, until they are detected by routine radiographic examination where as some long standing cases may undergo an acute exacerbation of the cystic lesion and develops signs and symptoms such as swelling, tooth mobility and displacement of unerupted tooth [7]. Associated teeth are always non-vital and may show discoloration [8].

It clinically exhibits as buccal or palatal swelling in maxilla, where as in mandible it is usually buccal and rarely lingual. At first, the enlargement is bony hard but as the cyst increases in size, bony covering becomes very thin and the swelling exhibits springiness and becomes fluctuant when the cyst has completely eroded the bone as seen in present case [3].

Radiographically, most radicular cyst appears as round or pear shaped radiolucent lesion in the periapical region [9]. The choice of treatment can be determined by some factors such as extension, evolution, origin, clinical characteristics of the lesion, cooperation and systemic condition of the patient. Treatment options for radicular cyst can be R.C.T. when lesion is localized or surgical treatment like enucleation, marsupialization or decompression when the lesion is large [10].

### 5. Conclusion

Various treatment options are suggested depending on the location and size of the cyst. For large lesions endodontic management is followed by surgical enucleation of the cyst, however, nonsurgical management of small lesions is also proposed by some authors. This case report presents successful surgical enucleation of large radicular cyst with palatal perforation alongside with root canal treatment of the involved teeth and placement of Hawley's retainer. One year follow up and radiographs showed healing of lesion with bony trabaculae formation.

### Conflict of interest

None

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