

# Paediatric Maxillary Radicular Cyst: Surgical Strategies and Space Management

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## ABSTRACT

The most prevalent types of odontogenic cysts are radicular cysts, usually present adjacent to the apex of non-vital teeth, developing from epithelial rest cells of Malassez (ERM). They are the most common inflammatory cyst in the jaw but are uncommonly seen in paediatric maxilla with a prevalence rate of less than 0.5%. They tend to displace the surrounding anatomical structures, causing root resorption and sinus displacement as they increase in dimension and become large. This case report focuses on a large radicular cyst presenting in a paediatric maxilla of a 12-year boy, involving the right maxillary second molar and impacted maxillary second premolar, and displacing the maxillary sinus. A window was created and decompression was done by inserting a tube for six months which was then followed by enucleation of the cyst, under general anaesthesia.

**Key Words:** Radicular cyst, Maxilla, Paediatric, Decompression.

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## INTRODUCTION

Cysts are common in jaw-bones, and their diagnosis is often challenging. They can arise from any tissue, either non-odontogenic or odontogenic.<sup>1</sup> The most prevalent odontogenic cyst, radicular cyst (7 to 54% occurrence) in permanent dentition, results from inflammation due to pulpal death.<sup>2,3</sup> Rare in primary teeth (0.5-3.3%), they manifest through radiographic assessments, or if persistent, cause symptoms like swelling and tooth displacement.<sup>4,5</sup>

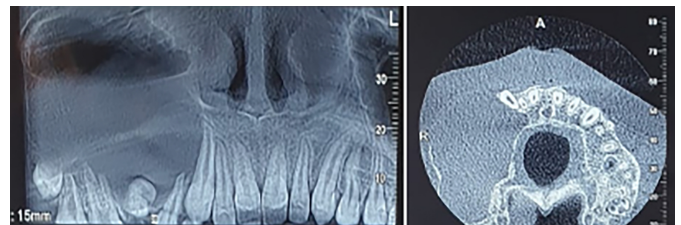
Predominantly affecting the maxilla (central incisors) or mandible (first molars),<sup>6</sup> their treatment involves enucleation, marsupialisation, or a combination of both,<sup>4</sup> as implemented in this case.

## CASE REPORT

A 12-year boy presented to the Department of Oral and Maxillofacial Surgery with a swelling in the right maxillary premolar region that had been persistent for two months. The dental history revealed that initially, the swelling was small initially but gradually increased in size. Dull, continuous pain, and occasional pus discharge were associated with the swelling.

Characteristics on extra-oral examination included a diffuse bony-hard swelling that was tender to touch with a slightly raised temperature of the swelling area. Intra-oral examination revealed a grossly carious right maxillary second molar which had Grade 2 mobility and an impacted second pre-molar. Maxillary molars on the left side and mandibular right molars were also carious. The history revealed no systemic symptoms associated with the swelling. Other features on intra-oral examination included poor oral hygiene with plaques on all teeth. The swelling had smooth borders, a pinkish-red colour, and soft consistency on palpation.

Cone beam computed tomography (CBCT) of the right side of the maxilla showed a unilocular radiolucency with well-defined borders in the canine region extending to the right molar region (Figure 1). The maxillary sinus and adjacent teeth were considerably displaced by the cystic lesion. Buccal cortical plate perforation was also seen, and eggshell thickening of the buccal plate was observed.



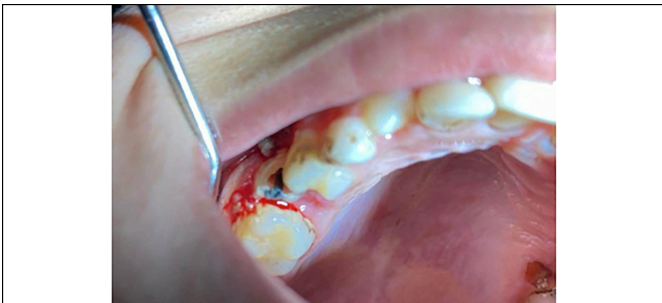
**Figure 1:** Cone beam computed tomography (CBCT) showing a radiolucent lesion, before the initiation of the treatment.

On aspiration, straw coloured fluid was seen. A biopsy specimen was taken and sent to the laboratory with the differential diagnoses of radicular cyst, odontogenic keratocyst, and dentigerous cyst, which usually is related to an impacted tooth. The biopsy report confirmed the diagnosis of a radicular cyst.

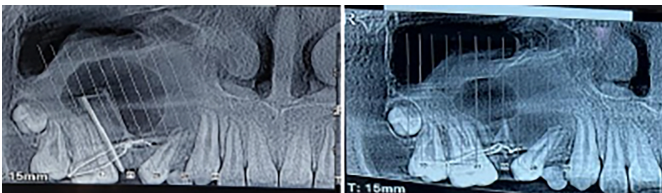
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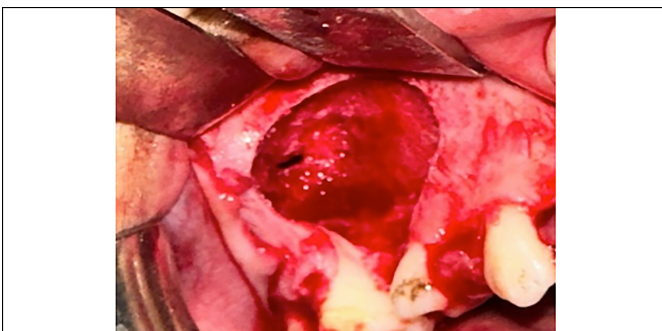
A comprehensive treatment plan was made for the patient which included decompression of the cyst, for which informed consent was taken from the patient's family. The mobile right maxillary deciduous molar was extracted first, followed by the surgical extraction of the impacted second premolar. Both procedures were carried out under a local anaesthesia. The second premolar was extracted to make way for the tube to be inserted for decompression of the cyst. The cystic lining associated with the tooth roots was removed. A tube was then anchored by a wire in the cystic cavity to facilitate the drainage of pus and to aid in reducing the size of the cavity (Figure 2). The patient's progress was monitored every two weeks for four months. The tube was changed every month. The patient's parents were provided with guidelines to maintain oral hygiene and cleanse the fluid that emerged from the tube. After four months, there was a notable reduction in the size of the cyst. Additionally, follow-up CBCT scans were conducted at the four-month and six-month marks, as depicted in Figure 3. Subsequently, the cyst was scheduled for removal under the general anaesthesia. The removal procedure included enucleation, along with performing an apicectomy and endodontic treatment of the upper right permanent molar (Figure 4). The surgical area was then closed using Vicryl sutures, and the patient's progress was closely monitored through weekly follow-up appointments for one month.



**Figure 2:** Intra-oral picture showing the tube placed to drain the cyst.



**Figure 3:** Cone beam computed tomography (CBCT) showing a reduced cyst size while the treatment was still undergoing.



**Figure 4:** The creation of a bony window and the procedure of enucleation.

## DISCUSSION

A radicular cyst is commonly associated with teeth that lack vitality due to pulp necrosis caused by caries or trauma. The activation of epithelial cell rests of Malassez (ERM) due to inflammatory stimuli results in the development of a radicular cyst. Initiation, cyst formation, and enlargement are the three stages in the pathophysiology of this cyst. Swelling, mobile teeth, displacement of teeth, not yet erupted, and root resorption are some of the signs and symptoms which are associated with radicular cysts.<sup>7</sup>

The lesion involved in this case was examined histopathologically, and a diagnosis of a radicular cyst was made based on the biopsy report. The interior of the radicular cyst is lined up by non-keratinized stratified squamous epithelium, which can either be partial or complete, and is surrounded by a fibrous wall that may contain multiple capillaries. Keratinisation is an infrequent occurrence accounting for as little as 2% of the reported cases. Ortho-keratinisation is more prevalent within the cyst than parakeratosis, accompanied by a noticeable concentration of inflammatory cells like lymphocytes and plasma cells.<sup>1</sup>

In this scenario, various approaches existed for addressing this cyst, yet decompression followed by enucleation was chosen as the treatment of choice. Marsupialisation or decompression is typically employed when there is a potential risk of damaging anatomical structures adjacent to the cyst, aiming to avert potential bony defects and safeguard neurovascular structures from injury.<sup>8</sup> During decompression, an incision is made on the outer surface of the cyst to create an opening which allows the cystic contents to be drained in the oral cavity, leading to a decreased pressure in the cyst, and the defect is gradually filled up by bone.<sup>4</sup> Enucleation is always the treatment of choice for smaller cysts as it is more advantageous as compared to marsupialisation or decompression.<sup>9</sup> The common disadvantage of decompression is that the cavity must be irrigated frequently to keep it clean, and patient compliance is extremely important.

An enlargement of the cyst in this case led to a significant obliteration of the right maxillary sinus, as a result of which, the patient had various nasal issues including persistent facial discomfort, frequent cold symptoms, and nasal blockages.<sup>10</sup> In addition to removing the cyst, apicectomy, and endodontic treatment of the right maxillary 1<sup>st</sup> molar was done to prevent the recurrence of the lesion.<sup>11</sup>

Various factors such as the location of the lesion, its proximity to important anatomical structures, and its dimensions play a pivotal role in determining the appropriate treatment modality for the management of this cyst. This particular case was treated by a combination of decompression followed by enucleation, due to its massive size and its proximity to the maxillary sinus.

### PATIENT'S CONSENT:

Informed, written consent was taken from the guardian of the

patient.

**COMPETING INTEREST:**

The authors declared no conflict of interest.

**AUTHORS' CONTRIBUTION:**

ZSR: Contribution to design of work and drafting of the work.

FM: Drafting the work and integrity of case report.

SAAH: Analysis, contribution to design/topic, drafting of the work.

MF: Final approval and drafting of the work.

All authors approved the final version of the manuscript to be published.

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