

Radicular Cyst with Primary Mandibular Molar: A Rare Occurrence

Mridula Goswami¹, Neha Chauhan²

ABSTRACT

Aim: This case report aims to describe the importance of early diagnosis, various clinical features, and management of radicular cyst with primary mandibular molar.

Background: Radicular cyst is an odontogenic inflammatory cyst in origin seen more frequently in permanent dentition and rarely in the primary dentition. It can develop due to pulp injuries or pulp necrosis caused by deep dental caries or dental trauma. It may adversely affect the normal development and eruption of the permanent succedaneous teeth.

Case description: We report a case of radicular cyst in association with the primary mandibular molar and its therapeutic management.

Conclusion: The efforts in diagnosing and managing radicular cyst when associated with primary teeth hold a good impact on a child's oral health status. Good amount of bone healing and development of the succedaneous permanent tooth bud in its normal position were observed when managed appropriately.

Clinical significance: Early diagnosis, proper treatment planning, appropriate management, and regular follow-ups of radicular cyst in primary dentition hold great importance for pediatric dentists as well as general dentists in routine dental practice.

Keywords: Diagnosis, Management, Primary teeth, Radicular cyst.

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INTRODUCTION

A cyst typically refers to an abnormal hollow space that is typically covered with epithelial tissue and contains a fluid or semifluid substance, excluding pus.¹ Most cysts in the jaw, with rare exceptions, are epithelial lined cysts and usually derived from odontogenic apparatus and remnants.² According to the classification provided by the World Health Organization (WHO), odontogenic cysts are categorized into two primary groups based on their origin. These groups consist of inflammatory cysts, exemplified by radicular cysts, and developmental cysts, typified by dentigerous and keratocyst.³

The most prevalent among inflammatory odontogenic cysts is the radicular cyst, which arises from epithelial remnants of the periodontal ligament, known as the epithelial cell rests of Malassez, often occurring after pulp necrosis. However, it is noteworthy that radicular cysts are relatively uncommon in primary dentition. The prevalence of radicular cysts in permanent dentition ranges from 7 to 54%, while in primary dentition, it constitutes approximately 0.5–3.3% of the total number of radicular cysts occurring in both primary and permanent dentition.⁴

Most radicular cysts of the primary dentition are associated with mandibular molars. In a 1995 study conducted by Mass et al., it was found that the average age of the individuals in the study was 7.7 years old, with a nearly equal distribution between males and females. Furthermore, when considering the location within the oral cavity, it was observed that mandibular primary teeth were more commonly affected compared to maxillary teeth.⁵

The cause of this condition is associated with pulp injuries or pulp necrosis, typically resulting from extensive dental caries or dental trauma. According to Bernardi et al.,⁶ the process leading to the development of radicular cysts involves several steps, including pulp necrosis, the invasion and growth of microorganisms

^{1,2}Department of Pediatric and Preventive Dentistry, Maulana Azad Institute of Dental Sciences, Delhi, India

Corresponding Author: Neha Chauhan, Department of Pediatric and Preventive Dentistry, Maulana Azad Institute of Dental Sciences, Delhi, India, Phone: +91 9971587432, e-mail: nc000006@gmail.com

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within the root canal system, the release of bacterial toxins and inflammatory mediators into the periapical region, and a complex interplay of factors involving interactions between epithelial and stromal cells. This periradicular inflammation ultimately triggers the proliferation of epithelial cell rests.

These lesions are typically discovered during regular radiographic evaluations of primary teeth that exhibit endodontic issues. In some cases, lesions that have been present for an extended period can lead to noticeable enlargement of the cortical bone and manifest clinical indications, such as swelling, tooth mobility, and potential harm to the developing permanent successors.⁵ From a radiographic perspective, they present as circular or pear-shaped solitary radiolucent formations located in the periapical region, encompassed by a delicate rim of cortical bone.⁷

Different treatment choices encompass root canal therapy, surgical removal of the cyst, extraction of the affected tooth, and, for larger cysts, a procedure known as marsupialization followed by decompression.⁸ Conservative management is often the approach for smaller cysts, while larger ones typically require surgical treatment through enucleation. When the affected tooth is deemed

to have a poor prognosis, complete cyst removal, along with the extraction of the corresponding primary teeth and preservation of the permanent teeth, becomes one of the most suitable treatment options in such cases.⁹ Consequently, this article aims to present a case involving a radicular cyst associated with a mandibular primary molar and discuss its treatment.

CASE DESCRIPTION

An 8-year-old male patient presented to the department with the primary concern of experiencing swelling in the lower right posterior tooth area for the past 10 days. The patient's medical history indicated recent antibiotic treatment. Regarding dental history, the swelling was initially small and has progressively grown to its current size. Notably, there were no reports of pus discharge or ulceration, but the swelling was accompanied by continuous, dull, and mild pain.

On extraoral examination, mild swelling was appreciable in the lower right side of the face without loss of facial asymmetry. Upon intraoral examination, it was evident that there were several teeth with cavities in both the upper and lower arches, indicative of suboptimal oral hygiene. Additionally, a close examination identified severely decayed right primary first and second molars with noticeable expansion of the buccal cortical plate. Furthermore, the orthopantomogram (OPG) revealed a radiolucent area affecting the enamel, dentin, and approaching the pulp in relation to tooth 85, along with an altered eruption path for tooth 45. We observed a clearly delineated single-chambered radiolucent lesion measuring approximately 6 × 5 cm in size (Fig. 1), affecting both the mesial and distal roots of tooth 85, and it displayed a thin radiopaque perimeter. Given the clinical and radiographic evidence, a preliminary diagnosis of a periapical cyst associated with the mandibular right second primary molar was established.

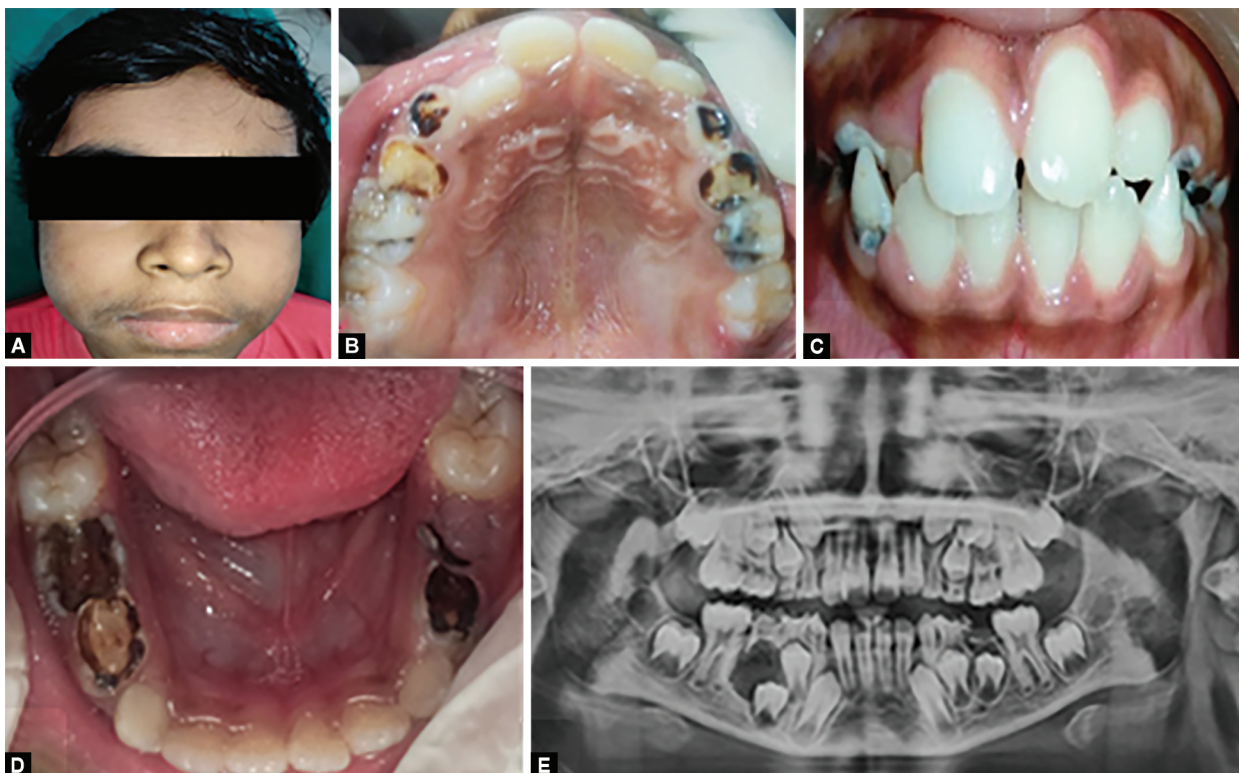
Taking into account the patient's age and the extent of the lesion, the treatment plan encompassed the extraction of the primary first and second molars under local anesthesia, along with the removal of the cystic lining through curettage. Following thorough irrigation, the socket was filled with sterile gauze infused with glycerin and iodoform to facilitate decompression (Fig. 2). A specimen was collected and forwarded for histopathological analysis.

The histopathological examination confirmed the provisional diagnosis of a radicular cyst. The examination revealed stratified squamous epithelium that lacked keratinization, characterized by an arcading pattern. In the underlying connective tissue, there was a dense fibrocollagenous matrix, and it exhibited a significant presence of inflammatory cells, predominantly lymphocytes and plasma cells (Fig. 3).

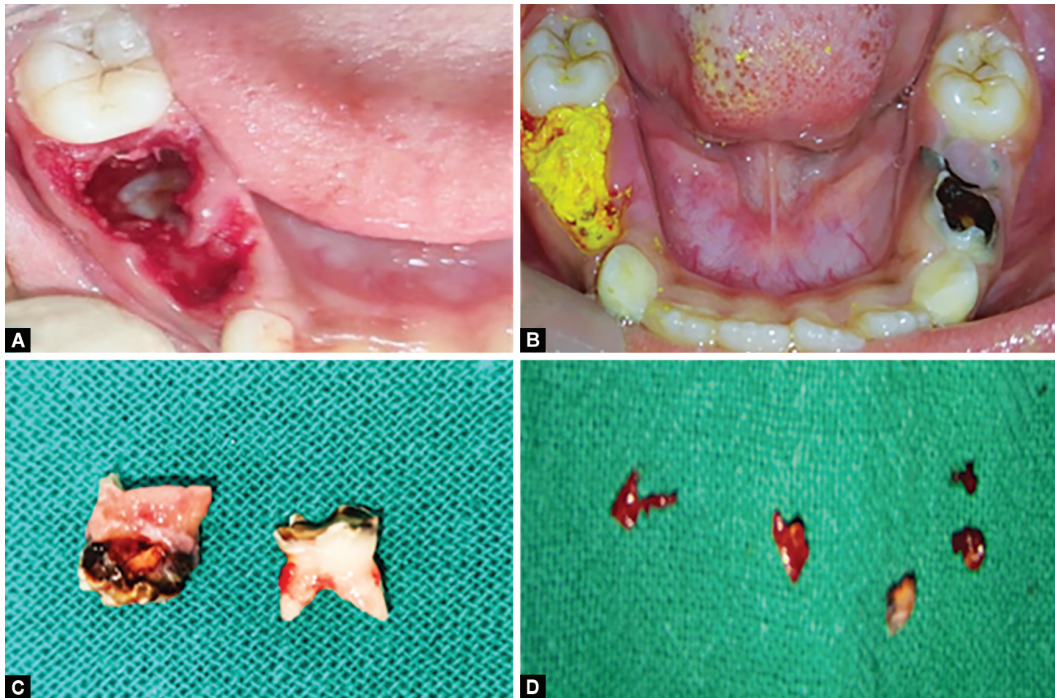
Analgesics and antibiotics were prescribed, and postoperative instructions were given. Patient was kept on strict follow-up every 4–5 days for repetitive glycerin-laced iodoform sterile gauze pack change for a period of 45 days.

DISCUSSION

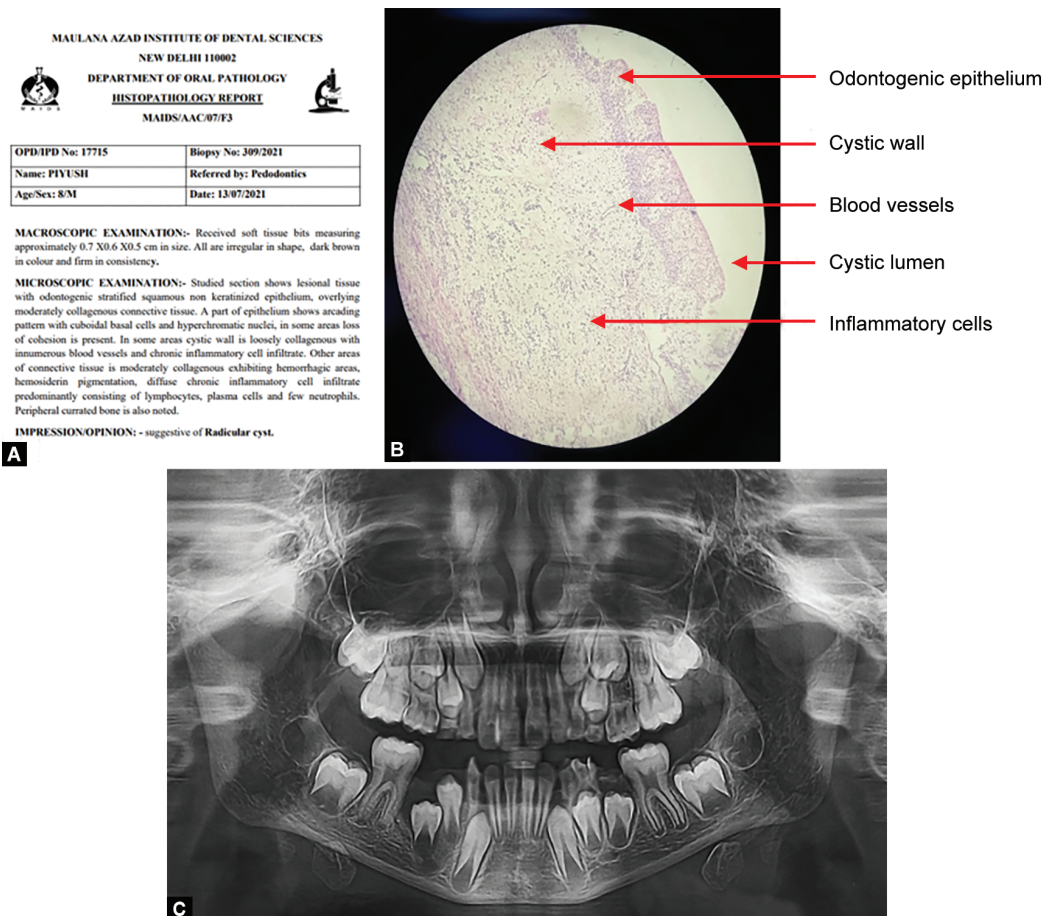
According to WHO classification, odontogenic cysts are categorized into two groups: developmental cysts and inflammatory cysts.³ Radicular cysts arise due to inflammation from the epithelial remnants in the periodontal ligament. Radicular cyst is seen more frequently in permanent dentition and seldom in primary dentition; this is the reason for the rarity given in Table 1. In a retrospective investigation conducted by Lustmann et al., they identified just seven confirmed instances of radicular cysts originating from deciduous teeth out of a total of 1,300 recorded radicular cyst cases (constituting 0.5%) observed over a 25-year span.¹⁰ In their review,



Figs 1A to E: (A) Extraoral view; (B to D) Intraoral preoperative pictures showing carious 53, 54, 63, 64, 65, 74, 75, 84, and 85; (E) OPG reveals periapical radiolucency wrt 85



Figs 2A to D: (A) Postoperative mandibular occlusal view after extraction wrt 84 and 85 followed by removal of cystic lining; (B) Iodoform dressing placed; (C and D) Extracted teeth and cystic lining



Figs 3A to C: (A) Histopathology report confirming radicular cyst; (B) Histopathological features showing epithelium and connective tissue capsule with arcading pattern of epithelium; (C) Postoperative OPG showing reduction in the radiolucency due to bone healing with further occlusal movement of the second premolar and continuation of root formation (3 months postoperative)

Table 1: Reasons for the rarity of radicular cyst in primary dentition as compared to permanent dentition

Radicular cysts are usually asymptomatic and are left unnoticed until detected by routine radiography
Deciduous teeth are present for a short time in oral cavity
A radicular radiolucency in relation to deciduous teeth is usually neglected being the milk teeth and early exfoliation
Periapical radiolucency of primary teeth may be misdiagnosed as a periapical granuloma or a dentigerous cyst of the permanent successor, hence differential diagnosis is important
Pulp and interradicular infections in primary teeth have a tendency to drain more than permanent teeth due to the presence of numerous accessory canals
The lesions tend to resolve on their own following the extraction/exfoliation of the associated tooth
After extraction, exfoliation, or endodontic treatment of primary teeth, less or nonreferral of the lesion for pathological examination
Periapical radiolucency of primary teeth may be misdiagnosed as a periapical granuloma or a dentigerous cyst of the permanent successor, hence, differential diagnosis is important

Table 2: Histopathological differences between radicular cyst in primary and permanent teeth

Rarity of cholesterol crystal in radicular cyst of primary dentition
Less number of hyaline inclusion seen in radicular cyst of primary dentition
Multinucleated giant cells present similar to the odontoclasts present in resorbing primary teeth

Nagata et al. noted that up until 2004, a total of 112 cases had been documented.¹¹ According to the findings of Sprawson et al.,¹² the occurrence of radicular cysts is an infrequent clinical observation, primarily attributable to the natural biological turnover of primary teeth. The prevalence of radicular cysts is highest in mandibular molars, primarily because these teeth are frequently subjected to dental caries.⁸

Radicular cysts typically do not cause symptoms and are often detected incidentally during routine radiographic assessments. However, an undiagnosed or untreated radicular cyst in primary teeth can have adverse effects on a patient's future dental development. Clinical indications of an untreated radicular cyst typically manifest as follows—swelling, sensitivity, tooth mobility, and a bluish discoloration resulting from the outward expansion of the cortical bone.¹³ Common radiographic observations associated with radicular cysts include the presence of a well-defined radiolucent area, a thin reactive cortical bone boundary, and the displacement of permanent successor teeth.⁹ Patient history, clinical assessment, radiographic imaging, and histopathological analysis are essential components in arriving at a diagnosis. Mass et al.⁵ and Subramanya¹⁴ revealed almost no much differences histopathologically between radicular cyst originating from primary to permanent teeth; however, some differences found and explained are given in Table 2.

The available treatment options for a radicular cyst encompass extraction, endodontic therapy, enucleation of the lesion, and marsupialization. The selection of the most appropriate treatment depends on various factors, including the cyst's location, size, the integrity of the cystic wall, and its proximity to vital anatomical structures.¹⁵ In our case report,

extraction of the involved teeth followed by enucleation of the lesion was done. Decompression of the lesion was performed with iodoform dressing. In children, the healing of postsurgical osseous defects tends to be favorable due to their high capacity for bone regeneration. The present case showed good amount of bone regeneration and considerable alignment of displaced permanent teeth at 3-month follow-up.

CLINICAL IMPLICATION

- Radicular cysts that originate from primary teeth are regarded uncommon despite the higher incidence of early childhood caries and dental decay in primary teeth. This rarity can be attributed to the fact that infections involving the pulp and periapical regions of deciduous teeth typically have better drainage mechanisms compared to those in permanent teeth. Additionally, the antigenic triggers that initiate the processes leading to the formation of radicular cysts may vary.
- Furthermore, in contrast to cysts involving permanent dentition, primary teeth are often extracted without being routinely subjected to pathological examination. This practice could potentially contribute to underestimating the true prevalence of cysts associated with primary teeth.
- Hence, early diagnosis, proper treatment planning, appropriate management, and regular follow-ups of radicular cyst in primary dentition holds great importance for pediatric dentists as well as general dentists in routine dental practice; this is done with the aim to save the primary tooth and let the child have the benefit of appropriate space maintainer (natural or appliance) after the treatment.

ORCID

Mridula Goswami  <https://orcid.org/0000-0002-0211-5210>

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