

# Treatment of Radicular Cyst with Marsupialization in Children: Report of Two Rare Cases

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## ABSTRACT

**Aim:** To present the treatment of radicular cysts with marsupialization in children and help reduce morbidity.

**Background:** Radicular cyst is a cyst with an odontogenic origin seen more frequently in permanent dentition and seldom in primary dentition. Radicular cysts can develop due to apical infection caused by caries or can also occur as a consequence of pulp therapy in primary teeth. It may adversely affect the normal development and eruption of the permanent succedaneous teeth.

**Case description:** We report two cases of radicular cysts in association with primary teeth with different etiologies and their conservative management with marsupialization and decompression techniques.

**Conclusion:** Marsupialization has shown to be effective in treating radicular cysts in primary teeth. Good bone healing and normal continued development of the succedaneous permanent tooth bud were observed.

**Clinical significance:** Marsupialization helps in preserving vital structures and reduces morbidity. It should be a preferred treatment modality for the management of large-sized radicular cysts.

**Keywords:** Case report, Conservative management, Marsupialization, Primary teeth, Radicular cyst.

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## BACKGROUND

Radicular cyst is inflammatory in origin and seen more frequently in permanent dentition and seldom in primary dentition. In the periodontal ligament, the remnants of the epithelial root sheath of cell rests of Malassez proliferate to form the cyst wall. Out of all the radicular cysts, only 0.5–3.3% are found to occur in the primary dentition. Shear estimated that radicular cysts in the first decade of life occur in the frequency of about 1%. From the year 1927 to 2004, 112 radicular cyst cases associated with deciduous teeth were reported in the dental literature. Radicular cysts can develop in primary teeth having an apical infection due to caries.<sup>1,2</sup> Pulp therapy is the treatment of choice for primary teeth with pulpitis or pulpal necrosis. Cyst formation may sometimes occur as a side effect of pulp therapy. According to Grundy et al., antigenic and necrotic products may be produced in the root canals by the pulp therapeutic agents, causing antigenic stimulus to the periradicular region.<sup>3</sup> It may also arise due to traumatic injury to primary teeth. In the early stages, the radicular cyst might be asymptomatic, however, if not treated, it may eventually cause bone expansion, resorption of bone, delay in the eruption of tooth, change in tooth position, mild sensitivity, tooth mobility, and defective developing succedaneous teeth in children.<sup>4</sup> On a radiograph, it may appear as a periapical radiolucent lesion which is oval or round circumscribed by a radiopaque margin. The radiopaque margin is usually well-defined but sometimes may be absent in case of an infected or rapidly growing cyst. A radicular cyst can be treated either by total enucleation, marsupialization, and decompression or both. These cysts rarely recur if treated adequately.<sup>2</sup> This paper presents two unusual cases of radicular cyst in children, which were managed conservatively.

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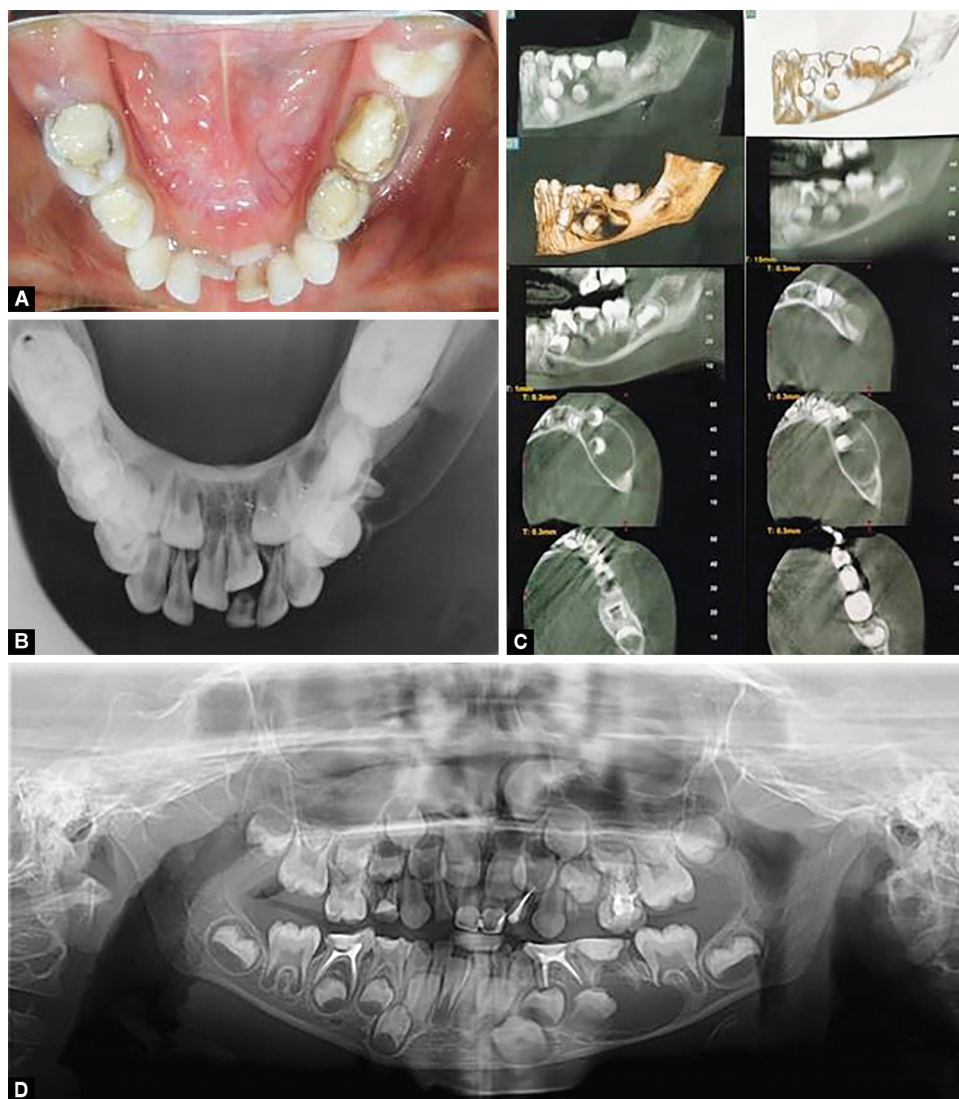
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## CASE DESCRIPTION

### Case 1

A boy aged 7 years reported swelling in the lower jaw on the left back teeth region for 12 days. Based on the patient's dental history, he had undergone a pulpectomy on the lower deciduous first molar on the left side and a pulpotomy on the lower deciduous second molar on the left side at a dental clinic 1 year before. On extraoral examination, there was a nontender, well-defined hard bony swelling measuring 2 × 1.5 cm in size on the body of the mandible of the left side. Intraorally, there was an expansion of the buccal cortical plate in the region of 74 and 75, which was palpable. The orthopantomogram illustrated an oval-shaped unilocular radiolucency with a well-defined border extending from the distal root of 74 to the middle of the distance between the developing mesial and distal root of 36, and totally surrounding the roots of 75. The tooth bud of 35 was mesially and apically displaced due to the radiolucent lesion. A cone beam



**Figs 1A to D:** (A) Preoperative intraoral photograph; (B) Mandibular occlusal radiograph showing buccal cortical plate expansion; (C) CBCT showing the extent of the radiolucent lesion; (D) Orthopantomogram showing a well-defined radiolucent lesion at the apex of 75 with a displacement of permanent tooth bud 35

computed tomography (CBCT) was advised to further evaluate the extent of the lesion with respect to the adjacent structures (Fig. 1). Based on the patient's findings, the provisional diagnosis given was a radicular cyst. Marsupialization of the cyst was planned as a conservative approach to prevent any damage to the permanent tooth bud. Prior to the surgery, routine blood tests were performed, and all indices were within normal limits.

Extraction of 74 and 75 was done under local anesthesia, which led to the opening of the cystic cavity and draining of the cystic fluid. The underlying cyst lining was thick and soft. A part of the cystic lining was incised from the wall of the lesion for histological examination. Marsupialization was performed by suturing the cystic lining with the healthy oral mucosa using a 3-0 vicryl suture. Cortical plates were compressed, and the cavity was irrigated with betadine and saline solution. For the decompression of the lesion, a removable appliance with a resin extension into the cystic cavity was inserted. Acrylic teeth were given to restore function (Figs 2A to C). Instruction was given to the patient's mother to irrigate the cystic cavity with normal saline twice daily along with cleaning of the appliance and maintaining oral hygiene. After 1 week, the

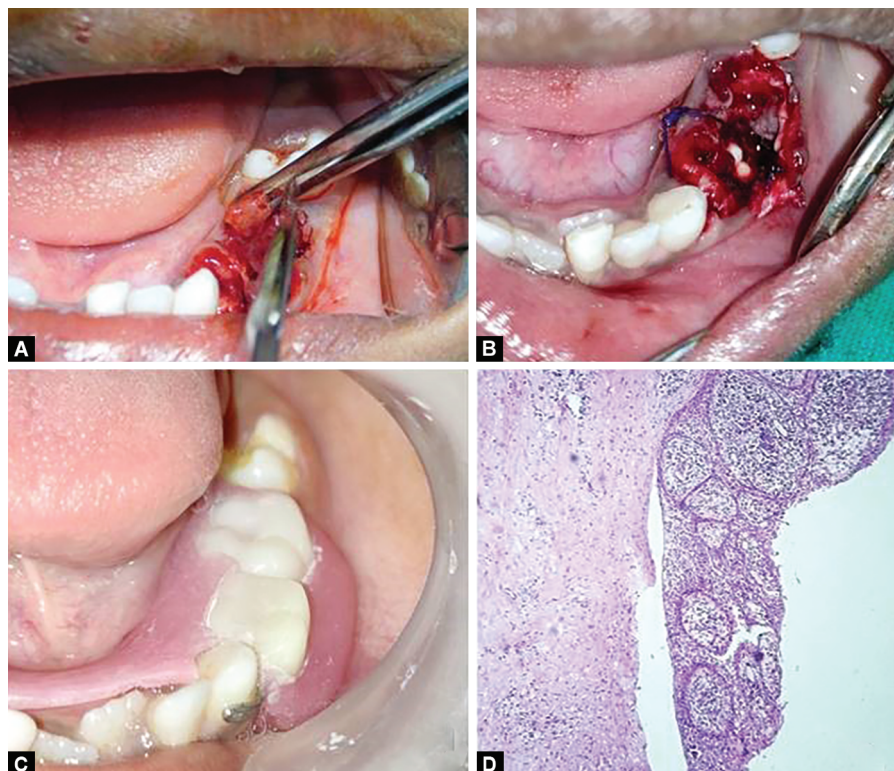
edges of the extraction wound had epithelialized. The patient was recalled for follow-up every 2 weeks for evaluation, and the resin projection was trimmed gradually to allow the eruption of the permanent teeth.

Histological examination revealed stratified squamous epithelium showing an arcading pattern of proliferation around entrapped inflamed stromal tissue; the stroma having diffuse chronic inflammatory cell infiltrate and mature collagen bundles (Fig. 2D). The clinical, radiographic, and histologic findings confirmed the diagnosis of the radicular cyst.

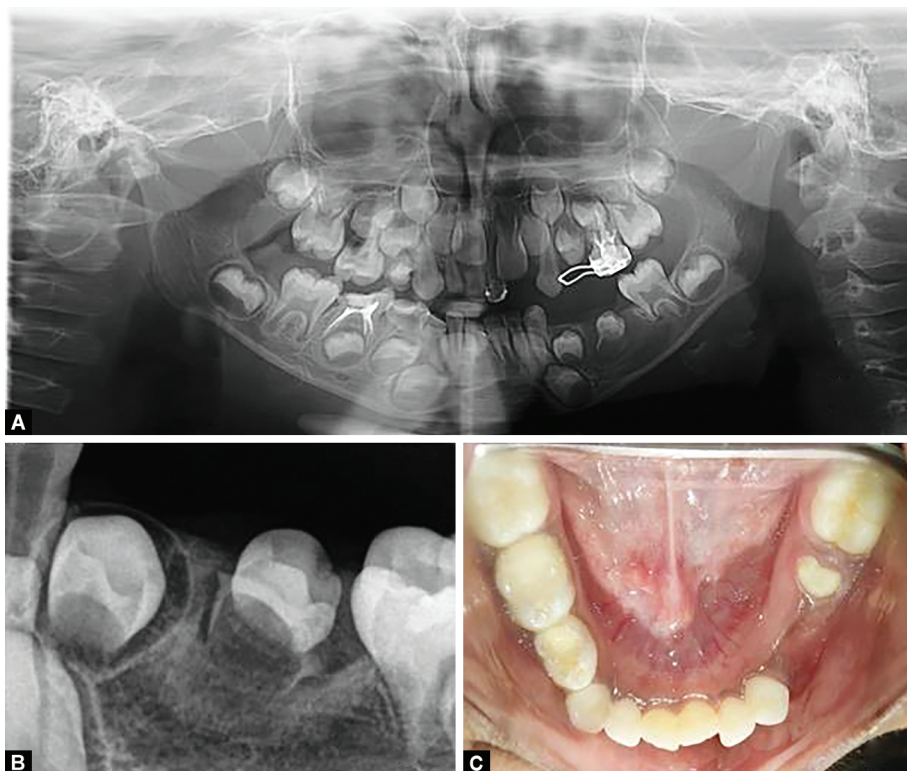
In the 12-month follow-up, a favorable eruption of teeth was noticed with complete resolution of the radiolucent lesion (Fig. 3).

### Case 2

An 8-year-old girl reported swelling in the lower jaw on the right side back teeth region for 1 week. Extraorally, there was a hard bony swelling, nontender and well-defined, measuring 2 × 2 cm in size on the body of the mandible on the right half. Intraorally, there was dental caries in relation to 85, grossly decayed 84, firm bony hard swelling, buccal cortical plate expansion in the region of 83 and



**Figs 2A to D:** (A) Part of cystic lining incised for histological examination; (B) Marsupialization performed; (C) Insertion of a removable appliance with acrylic teeth and a resin extension into the cavity; (D) Histological view showing stratified squamous epithelium arcading pattern of proliferation around entrapped inflamed stromal tissue, diffuse chronic inflammatory cell infiltrate and mature collagen bundles in the stroma



**Figs 3A to C:** (A) Orthopantomogram at 8-month follow-up showing healing of the lesion and normal position of permanent tooth bud 35; (B) Intraoral periapical in relation to 34 and 35 at 12-month follow-up showing their favorable position for eruption and complete bone healing; (C) An 18-month follow-up intraoral photograph showing partial eruption of 35

84 with slight bluish discoloration of the overlying mucosa. The orthopantomogram showed a round, unilocular radiolucency with a well-defined border extending from the root of 82 to the mesial root of 85, and totally surrounding the roots of 84. The tooth buds of 43 and 44 were apically displaced due to the radiolucent lesion. A CBCT was advised to further evaluate the extent of the lesion with respect to the adjacent structures (Fig. 4). A straw-colored fluid was collected on aspiration, which consisted of neutrophils, cyst macrophages, and a few lymphocytes (Fig. 5A). Based on the patient's findings, the provisional diagnosis given was a radicular cyst. Marsupialization of the cyst was planned as a conservative approach to prevent any damage to the permanent tooth buds. Prior to the surgery, routine blood tests were performed, and all indices were within normal limits.

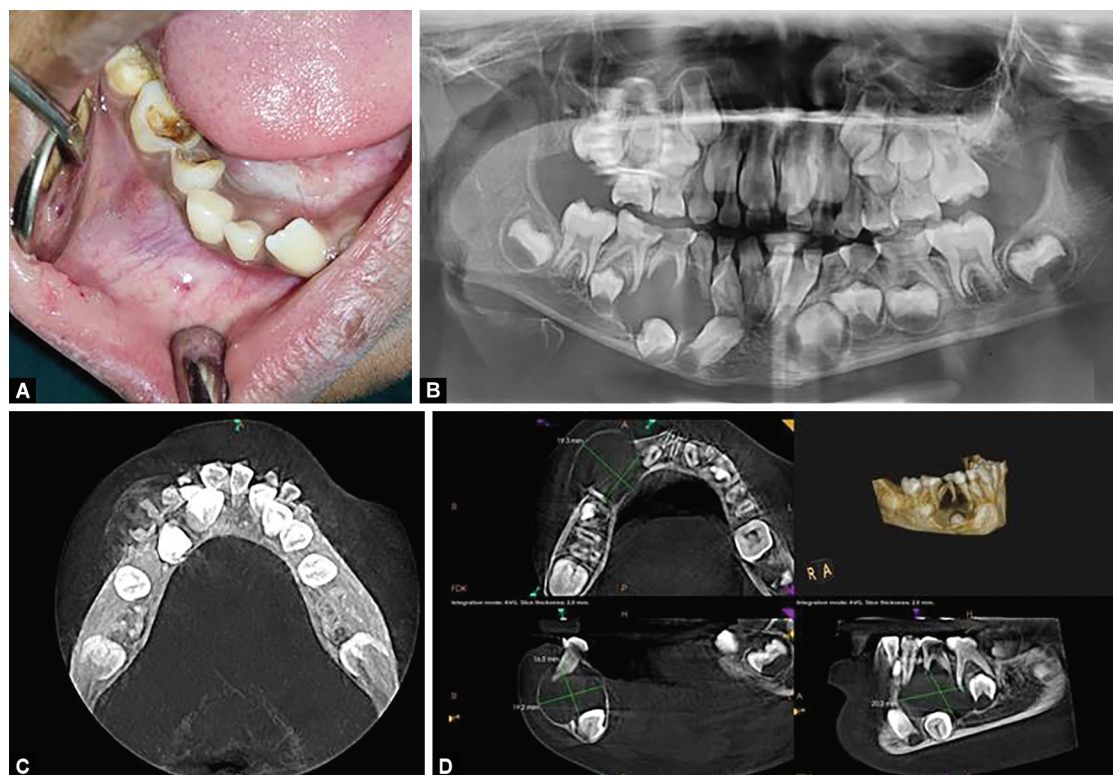
Extraction of 83 and 84 was done under local anesthesia. This created a window to the cystic cavity, and the cystic fluid was drained. The diagnosis was confirmed by a histological examination of a part of the cystic lining. Marsupialization of the cyst was performed. Cortical plates were compressed, and the cavity was irrigated with betadine and saline solution. A customized acrylic obturator was prepared and put into the cyst window for decompression of the cyst (Figs 5B to E). Instruction was given to the patient's mother to irrigate the cyst cavity with normal saline twice daily along with cleaning the appliance and maintain oral hygiene. After 1 week, the edges of the extraction wound had epithelialized. The patient was recalled for follow-up every 2 weeks for evaluation and trimming of the acrylic denture according to the size of the cyst cavity.

In the 12-month follow-up, a favorable eruption of teeth to its normal position in the jaw was observed with complete healing of the lesion (Fig. 5F).

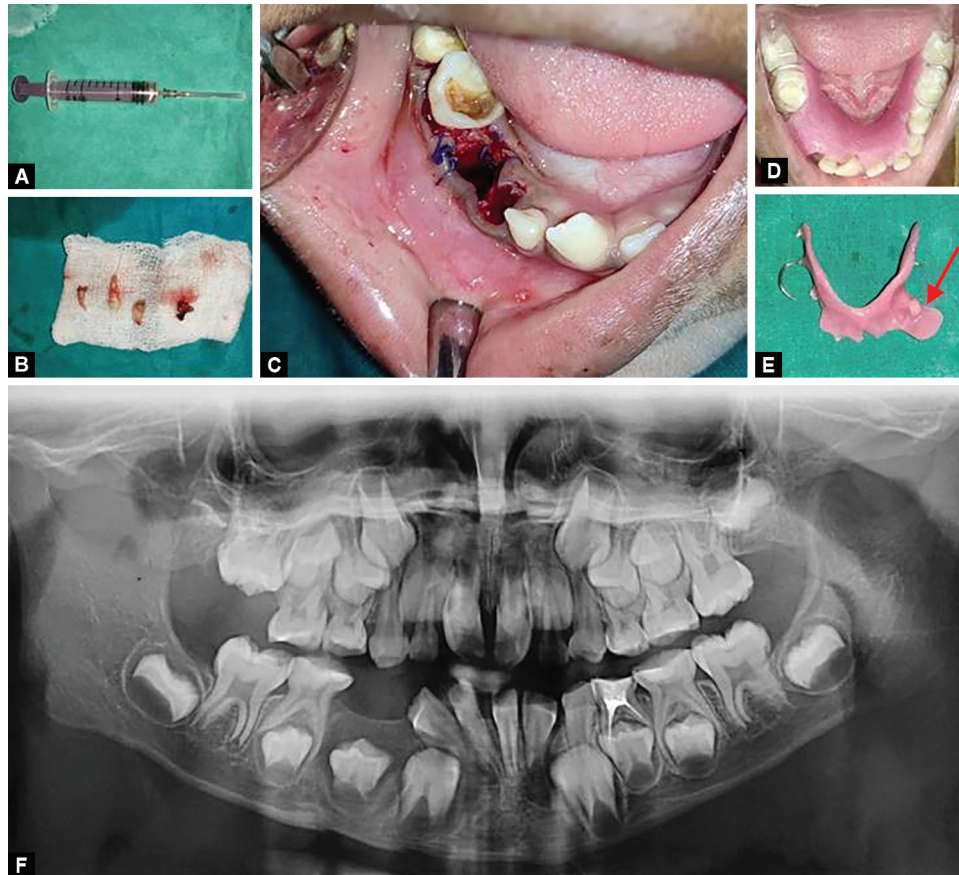
## DISCUSSION

Odontogenic cysts are classified as developmental cysts and inflammatory cysts.<sup>5</sup> Pulp necrosis leads to inflammation causing radicular cysts, as was seen in case 2. Radicular cysts generally do not show any symptoms and are discovered during routine radiographic examination.<sup>2</sup> As was seen in case 1, at times, periradicular inflammation may progress even after pulp therapy, and may remain asymptomatic for a long time. These treatments in deciduous teeth should be kept under long-term follow-up. Some authors have suggested that rapid growth of the cysts may occur due to the intracanal medicaments used in pulp therapy acting as possible stimulants.<sup>3,6</sup> Patient history, clinical evaluation, radiographic, and histopathological findings are important to come to a diagnosis. The radicular cyst may cause expansion of buccal cortical plate, radiographically it is seen as a periradicular radiolucency which is well-defined with a thin reactive cortex, and displacement of permanent tooth buds.<sup>6</sup>

Marsupialization is indicated in the case of a large-sized cyst to reduce morbidity, damage of important structures, especially those which are located near to mandibular canal, antrum, and permanent tooth buds, avoid major bone loss, prevent growth disturbances, and avoid pathologic fracture.<sup>7</sup> The intracystic pressure was relieved by marsupialization or decompression through an opening or a fenestration on the outer wall of the cyst through which the cystic content drained into the oral cavity leading to bone growth within the cavity. The resin extension in the removable appliance helped in the decompression of the cyst, prevent the accumulation of food debris and prevent fibrous healing tissue formation, which could interfere with the eruption of the permanent tooth. Chiu et al., in 2008, have reported cases where post-treatment of odontogenic cysts



**Figs 4A to D:** (A) Preoperative intraoral photograph; (B) Orthopantomogram showing a radiolucent lesion in relation to 84 with a displacement of 44 and 43 permanent tooth buds; (C and D) CBCT showing buccal cortical plate expansion and the extent of the radiolucent lesion



**Figs 5A to F:** (A) Aspiration of straw-colored fluid; (B) Extraction of 83 and 84 along with excision of a small portion of cystic lining for histological examination; (C) Marsupialization performed; (D and E) Insertion of an acrylic obturator; (F) Orthopantomogram at 12-month follow-up showing complete bone healing and favorable position of the permanent tooth bud 83 and 84 for eruption

spontaneous alignment of permanent teeth has occurred despite highly unfavorable initial positions of tooth buds.<sup>8</sup> One of the major limitations of marsupialization in children is that this procedure requires frequent irrigation of the cavity to keep it clean. Both patient and parent compliance is of utmost importance. Regular follow-up visits are necessary to evaluate the healing of the osseous defect and to adjust the size of the acrylic plug.<sup>1,9</sup> Despite its drawbacks, marsupialization is a minimally invasive approach with the advantage of preservation of vital structures. It should be considered for the treatment of large-sized radicular cysts in association with deciduous teeth.

### CONCLUSION

Marsupialization has shown to be effective in treating radicular cysts in primary teeth. Despite the massive size of the lesion, in the cases, good bone healing and normal tooth development of the permanent succedaneous teeth were observed. The patient should be followed up till the eruption of the succedaneous teeth into the oral cavity. In addition, regular follow-up post-pulp therapies in deciduous teeth are also recommended.

### Clinical Significance

Marsupialization and decompression technique is a minimally invasive approach to the treatment of large-sized radicular cysts in children, which not only reduces morbidity but also has shown to

have a good prognosis with bone healing and subsequent eruption of the succedaneous tooth.

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