

A Ten-Year Follow-Up of Tooth Eruption Following Marsupialization of a Mandibular Dentigerous Cyst: Case Report of a Young Patient

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Abstract

Case Report

Introduction: Dentigerous cysts (DC) are the most frequent bone lesions of the jaws in childhood. On imaging, they commonly appear as a unilocular radiolucency encircling the crown of an unerupted or impacted tooth. Several therapeutic approaches are available depending on the size of the cyst, its location, and the age of the patient. Conservative treatments, such as marsupialization and decompression, have proven effective, especially in younger patients, by allowing for tooth eruption and reducing the size of the cyst without significant damage to surrounding structures. For larger cysts or those that pose a risk of recurrence, enucleation may be necessary to completely excise the lesion. **Case report:** This report describes a large mandibular DC, in an 11-year-old female patient, associated with permanent right second premolar. The DC was treated successfully by marsupialization leading to spontaneous eruption of the impacted tooth and followed up for 10 years with no sign of recurrence. **Discussion:** In the literature, spontaneous eruption of the involved tooth and full resolution of the cyst treated with only marsupialization without second surgical intervention has been rarely reported. Radiological follow-up plays a crucial role in monitoring the healing process and ensuring the proper eruption of the tooth in question. **Conclusion:** Long-term follow-up remains essential to monitor eruption patterns and confirm complete resolution.

Keywords: case report, dentigerous cyst, conservative treatment, impacted teeth, Marsupialization.

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INTRODUCTION

Dentigerous cysts (DCs) represent the most frequently encountered developmental odontogenic cysts within the maxillofacial skeleton. These cystic lesions are defined as epithelial-lined pathological cavities that envelop the crown of an unerupted or impacted tooth, most frequently involving third molars, maxillary canines, and premolars.

The surgical management of DCs is influenced by variables such as patient age, lesion dimensions, and the proximity to critical anatomical structures. Among the therapeutic options, marsupialization is considered a conservative and tooth-preserving intervention, particularly advantageous in pediatric populations. This technique entails creating a surgical window into the

cystic lesion, evacuating its contents, and suturing the cystic wall to the adjacent oral mucosa, thereby maintaining decompression. Successful outcomes rely heavily on meticulous post-operative follow-up and adherence to rigorous oral hygiene protocols [1].

While cases of spontaneous tooth eruption and complete cystic resolution following marsupialization alone are infrequently documented, this case report aims to present the 10-year clinical and radiographic outcomes of a large mandibular DC associated with an unerupted second premolar in an 11-year-old female. The cyst was managed exclusively with marsupialization, which led to spontaneous eruption and long-term resolution without recurrence [2].

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CASE REPORT

An 11-year-old girl was referred to the department of Medicine and Oral surgery of the University Dental Clinic of Monastir with a chief complaint of volume augmentation at the right side of the mandible (Fig.1). The patient had a history of anterior dental trauma.

The face was asymmetric with a small swelling on the right side of the body of the mandible, and lymph node examination was normal. In the lower lip, there was no difference in sensation. (Fig.1 A).

Intra-oral examination revealed a hard-bony swelling on the right body of the mandible extending from the mesial of 84 to the distal of 46. The covering mucosa was normal in appearance. There was persistence of mandibular deciduous second molars with poor restorations and recurrent caries. The 85 was endodontically treated. The maxillary permanent central incisors were restored with composite resin. Angle class I malocclusion was identified in the patient, with a skeletal Class I jaw-base relationship and a lateral open bite related to an atypical swallowing (Fig.1 B, C).



Figure 1: Clinical examination; (A) Extra-oral view; (B) Intra-oral view showing soft fluctuant swelling on right side of the mandible; (C and D) Photograph showing lateral open bite

Panoramic radiograph was requested and revealed a unilocular radiolucent area with sclerotic border on the right side of the mandible. The lesion extended from the mesial surface of 46 to the distal surface of 44 and was located above the mandibular canal. It surrounded impacted 45 which had incomplete root (1/3) and open apex. The 45 had distal angulation of 80 degrees. The buds of second and third permanent molars were present (Fig.2, A). CBCT (Cone beam

computed tomography) was carried out to evaluate the case. Hypodense image was detected in the body of the mandible area, right side in the axial and coronal sections, enclosing the crown of the permanent second premolar. The crown of the 45 was buccally located and near the 46 mesial root. Disruption of the vestibular cortical bone was also noticed with expansion of both osseous cortices (Fig.2 B, C).

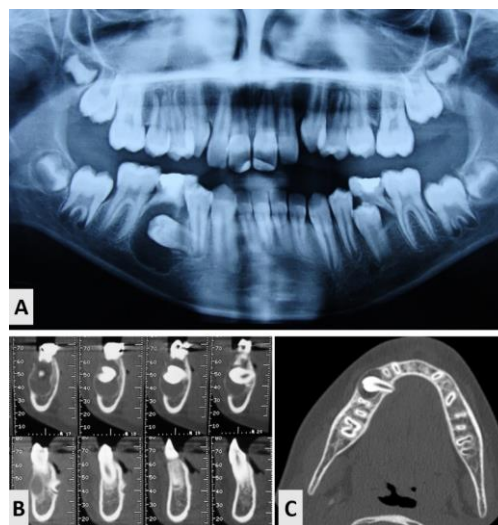


Figure 2: Radiographic examination; (A) Preoperative panoramic radiograph showed a large radiolucent area associated with a developing 45; (B, C) CBCT images: cross-sectional and axial slices

Based on the clinical and radiographic findings, diagnostic hypotheses were dentigerous cyst and peri-apical cyst with infection from the primary second molar. The differential diagnosis may be extensive and can include the other cysts and benign cystic tumors of the jaw.

Depending on the cyst size, its location and the patients' age, marsupialization was indicated to preserve the developing mandibular right second premolar followed by orthodontic treatment.

• Surgical stage

Preoperatively, the patient rinsed with 2% chlorohexidine mouthwash. Under local anesthesia, diagnostic aspiration using a 5-cc syringe revealed

whitish fluid mixed with blood. Primary 85 was simply extracted. After the evacuation of the contents, the cyst's "roof" was removed, and the surrounding mucoperiosteum was sutured to the cyst wall's edges. Inside the cavity, a pack of gauze was applied up to the extraction site (Fig.3). Tissue from the exposed membranous wall was transferred to the lab for histologic examination, and the diagnosis of dentigerous cyst was confirmed (Fig.4). The histopathological examination revealed a cystic wall composed of highly vascularized granulation tissue with a polymorphic inflammatory infiltrate, lined by a thin non-keratinizing squamous epithelium. The patient came on the second day after the operation to remove the pack of gauze. The wound was irrigated with chlorohexidine 2% and oral hygiene instructions were given. She was then referred to orthodontic treatment for correcting teeth position.

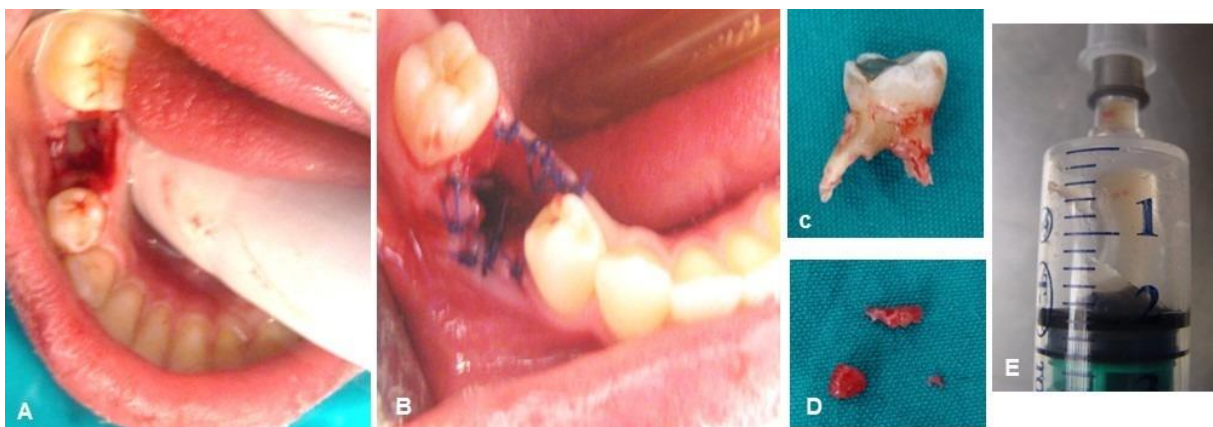


Figure 3: (A) Intraoral photograph following extraction of the right mandibular second deciduous molar; (B) Oral mucosa and cyst lining were joined by sutures; (C) Extracted 85; (D) The excised roof of the cyst lining was taken as biopsy; (E) fluid aspirated from the cyst

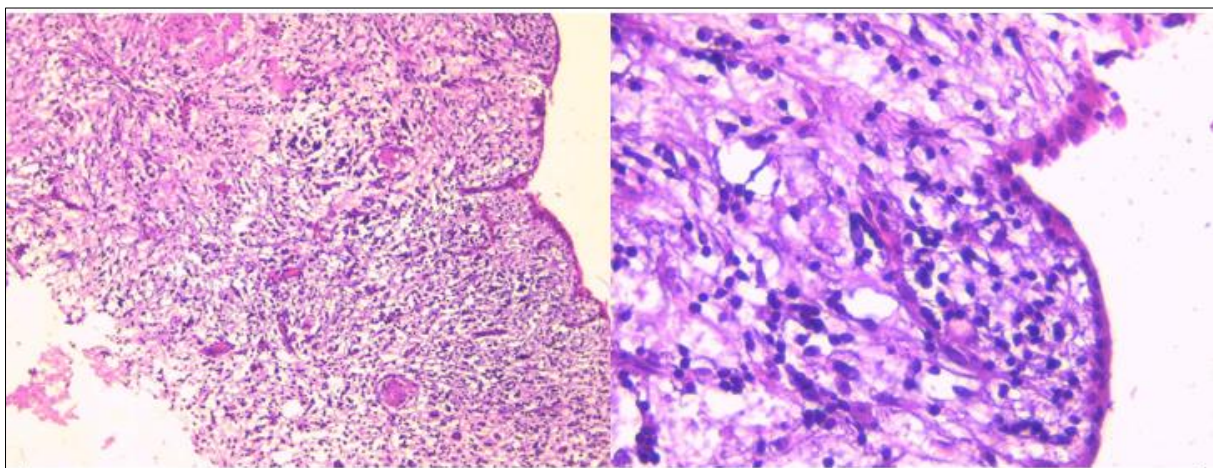


Figure 4: Histopathological examination of the enucleated specimen showing an inflamed fibrous cyst wall lined by a thin cuboidal epithelial lining

• ORTHODONTIC STAGE

First of all, it was necessary to build an "Enveloppe Linguale Nocturne" (ELN) for this patient. With ELN the tongue reaches the physiologic position during the swallowing and it is possible to have a low dental contact without tongue interference. A .014-in

Nickel Titanium segmented arch wire was fixed on the 44 and 46 and used to maintain space for the permanent mandibular second premolar.

The patient was seen every 4 weeks for clinical and radiological follow-up and for adjustment of the

ELN. After one year of follow-up, the lesion had completely withdrawn and spontaneous eruption of the impacted premolar was observed (Fig.5).

Then, cementation of orthodontic bands was performed on the mandibular and maxillary left and right first molars. The upper and lower arches were bonded with initial wire NiTi (.010, .016 inch). The patient was recalled monthly for reevaluation and to make the required adjustments for the appliance.

The duration of orthodontic treatment was 36 months. At 5 years after surgery, clinical and radiological examination showed uneventful eruption, and alignment of the impacted teeth with correction of the anterior open bite. The patient consulted us, 10 years after the first visit, for wisdom teeth removal. Therefore, panoramic radiograph was requested and showed no signs of lesion recurrence (Fig.5).



Figure 5: Radiological follow-up showing the complete healing of the dentigerous cyst and eruption of the affected tooth

DISCUSSION

Dentigerous cysts rank second in prevalence among odontogenic cysts after inflammatory radicular cysts, predominantly diagnosed between the ages of 10 and 30 [2, 3]. They are often asymptomatic but may induce significant cortical expansion and tooth displacement [4, 5]. Radiographically, they manifest as unilocular radiolucent areas surrounding the crown of unerupted teeth, typically with sclerotic borders. While mostly solitary, DCs can present as multiple lesions in syndromic contexts (e.g., Gardner syndrome, mucopolysaccharidosis, basal cell nevus syndrome) [1].

The treatment of DCs relies on the size and location of the cyst, patient's age, the teeth involved and cyst proximity to vital structures [1]. Several treatment modalities have been mentioned in the literature, ranging from marsupialization to enucleation. However, loss of a permanent tooth in the management of an odontogenic cyst can be devastating in young patients [6, 7].

Marsupialization or decompression is a conservative surgical approach in children and pre-adolescents to protect the teeth and the neighboring vital structures. The technique of marsupialization, or Partsch's technique, consists of removing a window from the lesion and suturing the surrounding mucoperiosteum to the margins of the cyst wall [8]. Therefore, intracystic pressure is relieved, the cyst is reduced in size, and bone apposition develops gradually at the location [9]. This conservative approach can be used as a single therapy for a cyst or as preliminary procedure for subsequent

enucleation [10]. Because enucleation in the present case would sacrifice the impacted permanent tooth in a young girl, marsupialization was the therapy of choice. In fact, Early tooth loss has an impact on occlusion, esthetic appearance and function. Furthermore, enucleation carries a risk of large postoperative bone defect and trauma to the inferior alveolar nerve [11].

The cyst-associated tooth may spontaneously erupt a few months following marsupialization; however, in certain situations, orthodontic extrusion may be needed [11]. Orthodontic treatment, in addition to traction of an impacted tooth, generally includes opening or maintaining appropriate space using a fixed device to improve alignment and leveling. This was the approach adopted in the current report. The dentigerous cyst healed without complication and a satisfactory occlusion was achieved as a result of the therapy. To avoid damage to the surrounding structures, marsupialization should be considered when treating large DC, mainly in children.

A comparable case study involving an 8-year-old female patient was published in 2021 [12], focusing on an inflammatory dentigerous cyst. The cyst was alleviated through decompression, employing a removable space maintainer functioning as an acrylic obturator after the extraction of teeth 83 and 84. After ten months following the decompression intervention, there was notable complete resolution and regression of the cystic lesion, accompanied by the spontaneous full eruption of the premolar.

In a retrospective study published in 2009, 35 dentigerous cysts from 35 children underwent marsupialization. The age range of the children was 8 to 13 years old. The study findings suggest that, compared to the standard treatment, marsupialization may present as a more favorable choice for managing dentigerous cysts in pediatric case [13].

The likelihood of spontaneous eruption following marsupialization of cystic lesions has been investigated across several studies, with multiple predictive factors identified. Patient age consistently emerges as a strong predictor: younger individuals, particularly those under 10 years old, show a higher tendency for eruption, as highlighted by Hyomoto *et al.*, (2003) [14], Fujii *et al.*, (2008) [15], and Yahara *et al.*, (2009) [16]. This trend is further supported by Qian *et al.*, (2013) [17] and Nahajowski *et al.*, (2021) [18], who observed average ages near 10 years in patients with successful eruption.

The vertical position of the impacted tooth, particularly its depth relative to adjacent structures, has also been considered. Shallower impactions—generally less than 5 mm—were associated with improved outcomes in the studies by Hyomoto *et al.*, and Fujii *et al.*, whereas Qian *et al.*, and Nahajowski *et al.*, did not find depth to be a critical determinant.

Tooth angulation yielded inconsistent findings. Favorable eruption was observed when the tooth axis formed a smaller angle with reference planes in the work of Hyomoto *et al.*, and Fujii *et al.*, while Yahara *et al.* noted larger angles in non-erupted cases. Other authors, including Qian and Nahajowski, found no significant influence of angulation.

Available eruption space was found to be relevant only in isolated findings. Fujii *et al.* noted improved outcomes when more than 1 cm of space was present, but this factor did not show a consistent effect across other studies.

The stage of root formation appears to be one of the most reliable indicators. Teeth with incomplete root development and open apices demonstrated a higher potential for eruption across several reports, including those by Hyomoto, Fujii, Qian, and Nahajowski.

In conclusion, young age and incomplete root formation are the most reliable predictors of spontaneous eruption post-marsupialization, whereas the role of depth, angulation, and eruption space remains variable across different studies. These predictors align with our clinical case (Table 1).

Table 1: Predictive factors for spontaneous eruption of premolars linked to dentigerous cysts [14-19]

Analyzed Factors	Hyomoto <i>et al.</i> , 2003	Fujii <i>et al.</i> , 2008	Yahara <i>et al.</i> , 2009	Qian <i>et al.</i> , 2013	Nahajowski <i>et al.</i> , 2021
Age	Younger individuals show a higher likelihood of spontaneous eruption	Below 10 years old	Mean age: 9.8 years	No significant effect	Young age favorable (mean: 10 years)
Depth of Impaction	Average: 4.4 mm*	Less than 5.1 mm*	Shallower impaction correlates with greater eruption potential	No significant effect	Uncertain impact
Tooth Angulation	20.4° ± 21.8°*	Less than 25°*	Approximately 60.2°**	No significant effect	Uncertain impact
Available Eruption Space	Does not influence	Larger than 1 cm	No significant effect	No significant effect	Uncertain impact
Root Development Stage	Half-formed root	Incomplete root development	No significant effect	Open apex and incomplete root formation are associated with high eruption potential	Root formation less than 50%

There are various marsupialization devices to keep the opening patent as well as a rubber tube, a removable device, gauze packing, a space maintainer or an obturator. More recently, in 2016, Minghe and al [20] had demonstrated in his study that the use of hot pressure casting obturators was associated with better clinical outcomes and higher patients' satisfaction rates than

iodoform gauze. The ultimate advantage of using these decompression devices, mainly in the younger population to preserve the involved tooth buds, makes it an acceptable technique.

Conservative treatment of a DC was reported in several cases. A systematic review of the literature was

done in 2020 including 1089 patients, to evaluate the effectiveness of marsupialization or decompression for cysts and benign cystic tumors of the jaw; Marsupialization has been employed either as a standalone procedure or as a precursor to a second-stage surgical intervention, such as enucleation with or without adjunctive measures. It is predominantly used as a singular approach in cases of dentigerous cysts and radicular cysts, as it has demonstrated favorable outcomes for these types of lesions. Secondary treatments are more commonly observed in instances of odontogenic keratocysts and cystic ameloblastomas, owing to their elevated recurrence rates and localized aggressiveness [21].

However, there are also some limitations of the treatment. Firstly, it is a long healing period and the discomfort of the patient is obvious at the early stages of marsupialization. Secondly, patient compliance is required during the follow-up extending for a long period of time, which plays a major role in the success rate of this treatment plan marsupialization [8].

CONCLUSION

This case underlines the importance of early recognition of clinical signs suggestive of cystic jaw lesions by primary care physicians and general dentists, and highlights the value of interdisciplinary collaboration to ensure timely and minimally invasive management. The successful treatment of a mandibular dentigerous cyst in this pediatric patient through marsupialization, followed by orthodontic guidance, demonstrates the efficacy of conservative approaches in promoting tooth eruption and achieving functional occlusion. Long-term follow-up remains essential to monitor eruption patterns and confirm complete resolution. Further prospective studies are needed to validate this therapeutic approach and establish standardized clinical protocols.

Competing interests

The authors declare no competing interest

Authors' contributions

HH: study design, patient management, manuscript redaction

AS: contribute to study design and manuscript redaction

ID: revise the manuscript draft and patient management

AB: revise critically the manuscript draft and suggests some ideas.

AZ: Histological analysis and providing diagnostic confirmation

JS: Give final approval of the version to be published

All authors believe that the manuscript represents honest and ethical work.

Informed written Consent

Written consent was obtained from the patient for the use of personal information and images in this publication.

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