Management of complete impacted maxillary second deciduous molar with the aid of cone-beam computed tomography: Case report and a review of the literature

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ABSTRACT

Complete impaction of primary teeth is a very rare condition and less seen at the dental office compared with permanent dentition. To report the use of cone-beam computed tomography in the management of a 7-year-old boy with completely impacted maxillary second deciduous molar due to the presence of odontoma and a cystic lesion.

Key words: Cyst, impaction, odontoma, primary second maxillary molar

INTRODUCTION AND REVIEW OF LITERATURE

Tooth impaction is defined as a condition where the tooth failed to erupt due to a mechanical blocking and the tooth remains unerupted beyond its normal time of eruption.[1]

The prevalence rate of impacted primary teeth was found to be from 1.3% to 8.9% of the population with a significantly higher incidence between siblings.[2-4] In general, primary mandibular molars are affected more than 10 times as often as primary maxillary molars.[5]

The pediatric dentists face the problem of impaction of permanent teeth more often than that of primary one. Impaction of an anterior primary tooth is very rare. On the other hand, total impaction is a very rare condition.[6-8]

The impaction may be primary, where the teeth never have been erupted (also called primary failure of eruption) or it may be secondary, where the teeth after eruption become impacted again due to several factors. The primary failure of eruption is diagnosed when the unerupted tooth is covered by an intact mucosa and radiographs reveal the tooth to be deeply buried in the jaw bone.[9] The secondary failure of eruption is when the permanent tooth is prevented from eruption due to retained deciduous tooth, odontomas, cystic lesion and supernumerary tooth.

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Impaction is caused by systemic or local etiologic factors.[10] Local factors that contribute in impaction include developmental anomalies such as malposition, dilaceration, ankylosis, tumors, odontoma, dentigerous cysts and supernumerary teeth, whereas systemic-genetic interrelation factors could be due to cleidocranial dysostosis and hypopituitarism.[11,12]

Most of the early reported cases of impacted primary teeth were found to be due to the presence of odontomas.[10] Odontoma is an odontogenic tumor, which often causes disturbances in the eruption of teeth such as impaction, delayed eruption or retention of primary teeth.[13,14] Various locations of the odontomas associated with primary molars were reported in the literature, between the roots of a right lower second primary molar, between the crowns of the upper first and second primary molars, above the tooth crown of the lower right primary second molar and above the unerupted upper second primary molar.[11,15]

In the United States, a large-scale survey analyzed odontoma detection rates. The result of the analysis revealed that one-third of all cases were identified in children between 11 and 15 years, whereas the detection rate in those below the age of 5 years was 2% of all cases which was very low.[16]

Impaction of primary molars leads to several problems in the dental arch includes: Space loss, tipping of adjacent teeth, supra

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eruption of the antagonist and failure of eruption of the permanent teeth.[6,10,17]

Several treatment options were recommended for impacted deciduous or permanent tooth including extraction of the primary tooth and patient follow-up without treatment. However, the eruption process should be under the supervision.[18] The other treatment option is surgical exposure or surgical repositioning with or without orthodontic traction. On the other hand, in some cases surgical removal of the impacted permanent tooth was performed.[19] When the odontomas were found to be the cause, the treatment of choice is the surgical removal in both primary and permanent dentition. If the odontomas are removed early without causing any disturbance of the underlying tooth germ, this will lead to spontaneous eruption of the impacted teeth, whereas in other cases orthodontic traction is required.[12,20,21] Further, the underlying impacted teeth are sometimes extracted in association with the removal of the odontomas.[22] Furthermore, in patient when only removing the odontoma; the primary molar will be kept under observation to monitor its eruption.

In literature, few cases of total impacted maxillary second deciduous molars were presented. The aim of this paper was to present the management of a patient with complete impacted maxillary second deciduous molar.

CASE REPORT

We report a case of 7-year-old boy patient attended the orthodontic clinic regarding his missing teeth in the upper right buccal segment and his medical history was non-contributory.

INTRA ORAL EXAMINATION

On examination, the patient has severe gagging reflex. Intraoral examination revealed that the patient is in the primary dentition stage. Although the patient was 7-year-old, all first permanent first molars were unerupted. All the primary teeth except for the maxillary right deciduous second molar were present in the mouth.

RADIOGRAPHIC EXAMINATION AND FINDINGS

Cone-beam computed tomography (CBCT) was performed. Panoramic image revealed the presence of all permanent teeth and deciduous teeth in both jaws except the third molars. The maxillary right second deciduous molar with full root development was pushed very close to the floor of the maxillary sinus. The crown of the permanent second premolar was located in a superior and lateral position in relation to the crown of the impacted primary maxillary second molar [Figure 1].

Right lateral view showed the impacted maxillary right primary second molar and the crown of the successor permanent second premolar [Figure 2]. There was an oval shaped cystic lesion (radiolucent area) with an odontoma (radio-opaque structure) in the right maxillary region as well as second deciduous molar impaction [Figure 3]. At 2 mm cuts image revealed the crown of the maxillary right second premolar and the impacted maxillary right second deciduous molar.

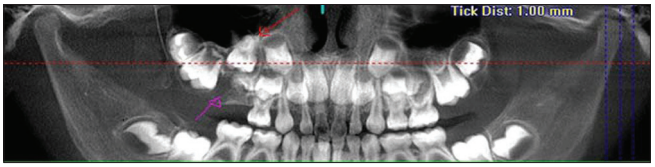

Figure 1: Panoramic image showed presence of all primary, permanent teeth and the impacted upper right primary second molar and its proximity to the floor of the maxillary sinus

Figure 2: Right lateral view showing the impacted maxillary right primary second molar and the crown of the permanent second premolar

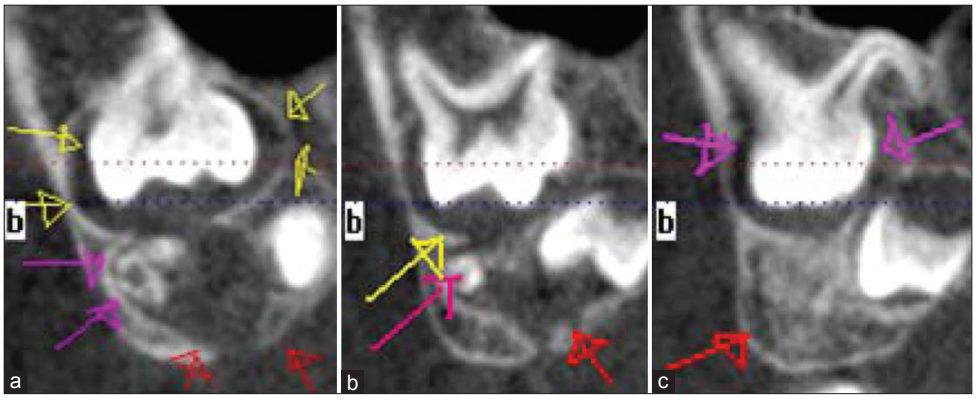

Figure 3: (a-c) 2 mm cuts radiographic view showing the impacted maxillary right primary second molar, radio-opaque mass (odontoma) was present above the crown of the maxillary right primary second molar and the crown of the maxillary right second premolar in addition to the cystic lesion (radiolucent area)

A radio-opaque structure (odontoma) was present above the tooth crown of the maxillary right second deciduous molar.

Three-dimensional (3-D) reconstruction supported the findings as the tooth like structure, cystic lesion as well as thinning of the cortical plate with occlusal perforation. Clover-shaped radiolucency was observed associated with the maxillary deciduous second molar, the permanent second premolar and the odontoma. The lesion was more buccally and the palatal bone was intact [Figures 4 and 5].

Multiplanner image exhibited clover shaped radiolucency with well-defined margin with a sclerotic rim and small radiopaque odontomas like structure [Figures 6 and 7].

The measurement of the cyst was 13.75 mm × 9.57 mm while of the odontoma was 5 mm × 6 mm [Figure 8].

DIAGNOSIS

The provisional diagnosis was; odontoma and cystic lesion impeding the eruption of the maxillary right second deciduous molar and the successor permanent second premolar.

TREATMENT OBJECTIVES

- Removal of the impacted maxillary second deciduous molar, odontoma and the cystic lesion.
- Regular follow-up every 6 months to monitor the remaining apical third of the palatal root and the eruption of the successor maxillary right permanent second premolar.

SURGICAL OPERATION

Patient was referred to the oral and maxillofacial surgery department. The odontoma and the cystic lesion were surgically removed under general anesthesia along with the maxillary second deciduous molar to create a clear path of eruption to the successor permanent second premolar. During the surgical removal of the maxillary second deciduous molar; the dilacerated apical third of the palatal root was broken. The oral surgeon decided to leave the broken part in order to avoid more tissue damage and/or development of oroanteral fistula.

POST-SURGICAL FOLLOW-UP

The recovery was uneventful and intraoral healing was satisfactory. Patient was followed-up regularly to monitor the remaining apical third of the palatal root and the eruption of the successor maxillary right permanent second premolar.

At 3 months follow-up after surgery; another CBCT was performed. The images revealed the presence of the dilacerated fractured remaining palatal root located very close to the floor of the maxillary sinus, the healing area of the odontoma and the cystic lesion as well as the slight movement of the successor maxillary right permanent second premolar [Figures 9-11].

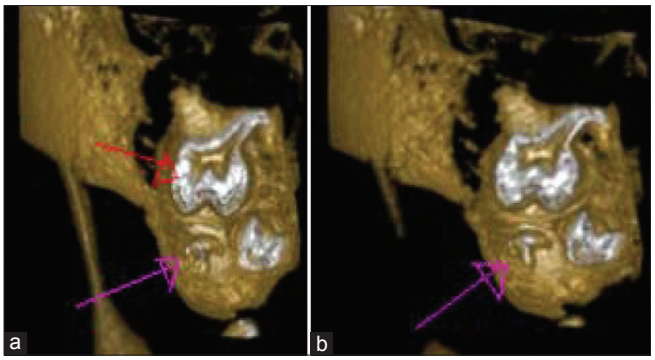

Figure 4: (a and b) Three-dimensional reconstruction view showing the impacted maxillary right primary second molar, radio-opaque mass (odontoma) was present above the crown of the maxillary right primary second molar and also the crown of the maxillary right second premolar

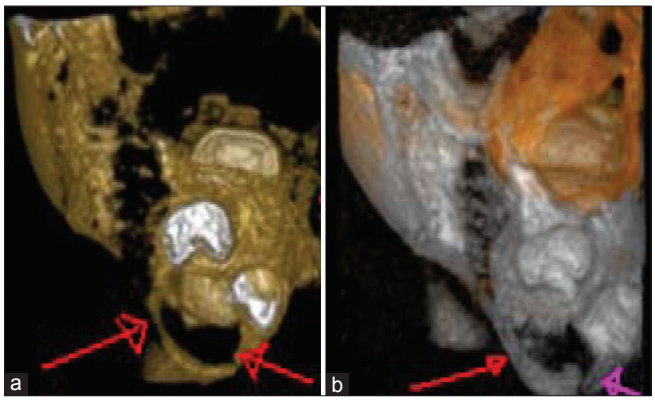

Figure 5: Three-dimensional volume rendered image of the cystic lesion (red arrows, (a) photograph) in addition to occlusal perforation (pink arrow (b) photograph)

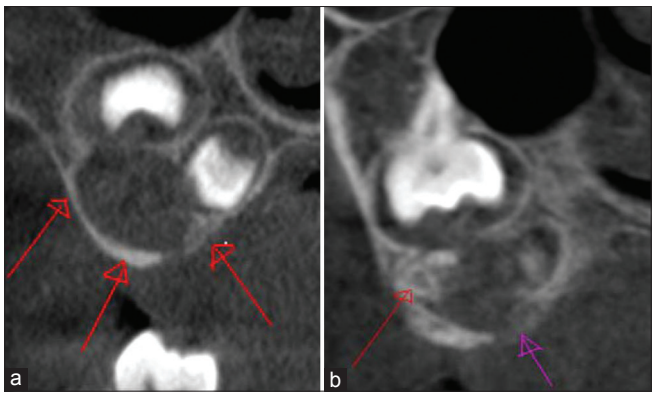

Figure 6: (a and b) Multiplanner image: Closer view of the cystic lesion (a) and the odontoma (b)

DISCUSSION

As mentioned earlier, tooth impaction occur more commonly in the permanent dentition and rarely in the primary dentition.[23,24] However, there are very few reports in the

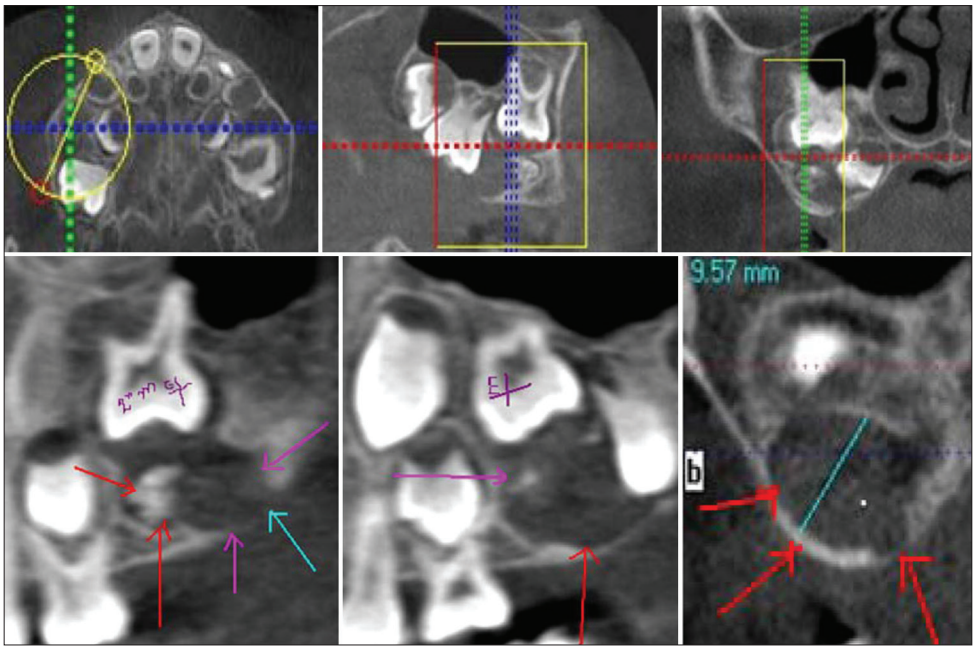

Figure 7: Multiplanner relations: Different positions with different sections

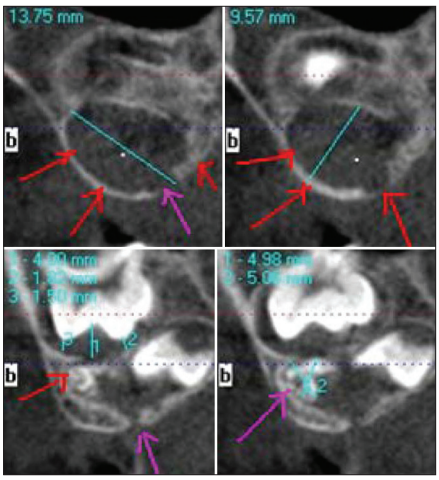

Figure 8: Showing the measurements of the cystic lesion (13.75 mm × 9.57 mm) and the odontoma (5 mm × 6 mm)

literature of odontomas associated with unerupted primary teeth.[12,15,25,26]

The etiology of impaction is still not known.[27,28] However, scanning electron microscopy studies of the root surfaces of extracted teeth revealed that most of these teeth were ankylosed.[6,29] The cause of the ankylosis is typically not clear, but few studies suggested that genetic factor may contribute to ankylosis.[2,3,27,30]

Memarpour *et al*.[31] reported a case of impacted primary molars positioned inferior to the succeeding premolars due to ankylosis. However, in the present case the odontoma and the cystic lesion were the cause of impaction and not ankylosis.

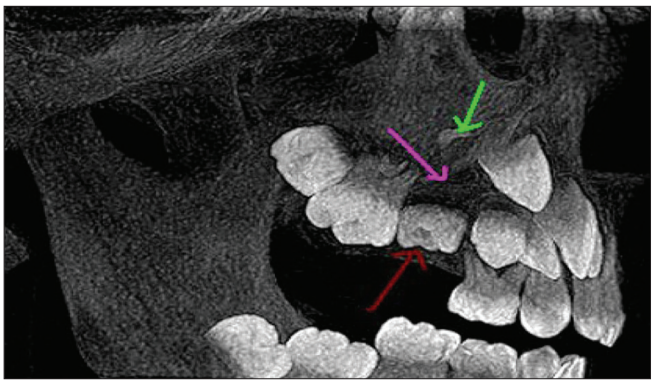

Figure 9: Right lateral cone-beam computed tomography image showing the remaining palatal root (green arrow) and the slight occlusal movement of the permanent second premolar (red arrow) 3 months after surgical removal of the odontoma, the cystic lesion and the second maxillary deciduous molar (pink arrow)

Based on the radiographic findings, surgical extraction of the impacted maxillary primary second molar, the cystic lesion and the odontoma was planned in order to facilitate the eruption of the second premolar. The treatment plan performed in the present case is in agreement with Ten Cate, Thornton and Zimmerman and Biederman who all recommended early tooth extraction for the treatment of impacted teeth[32-34] and in disagreement with Mcdonald *et al*.[35] who recommended, if the co-operation of patients is obtained, observation as the best treatment option since some impacted teeth may exfoliate while the rest may require extraction. In the present case report, the cystic lesion and the odontoma were surgically removed as well as the impacted maxillary second primary tooth.

Previous case reports relied mostly on periapical views and orthopantomograph (OPG). In the present case report, the CBCT

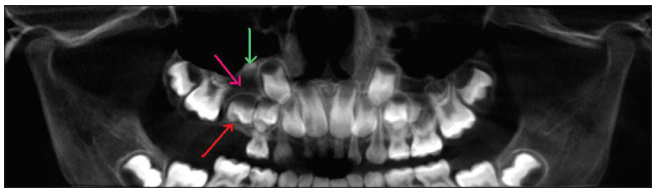

Figure 10: Panoramic image showing the remaining fractured palatal root of the maxillary second deciduous molar (green arrow) and the slight occlusal movement of the maxillary second permanent premolar (red arrow) 3 months postoperatively

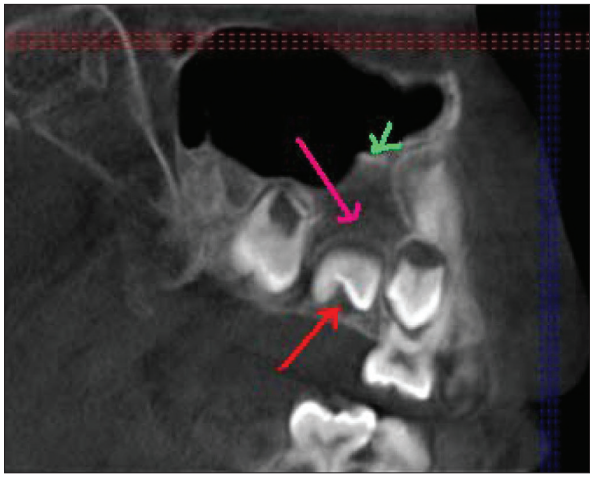

Figure 11: Close view showing the fractured apical part of the palatal root of the maxillary second deciduous molar very close to the floor of the maxillary sinus (green arrow), the healing area after removal of the odontoma and the cystic lesion (pink arrow) and occlusal movement of the right permanent maxillary premolar (red arrow)

was utilized. This technique has several advantages and benefits compared to the periapical and OPG radiographs. In the case of apical-third fractures of the root, there is usually no mobility and the tooth may remain asymptomatic. Furthermore, it has been observed that the apical segment of a transversely fractured tooth remains vital in most of the cases. Thus, no treatment is required and a watch and observe policy is advocated. If the dental pulp becomes necrotic in the apical fragment, surgical removal of the apical fragment is indicated.[36] Gündüz *et al*.[37] reported an incident of a minor communication with the maxillary sinus (oroanteral fistula) during removal of the impacted maxillary deciduous molar. In the present case report, the fractured dilacerated apical third of the palatal root was left to avoid such complication until it is either resorbed by itself or kept under regular follow-up.

Based in the above information and in addition to the low exposure to radiation, it is recommended to take an OPG or CBCT at the age of 7-8 years (early mixed dentition stage). This is essential for the early detection and localization of any abnormality such as odontoma, congenital absent teeth, cystic lesions and supernumerary teeth. Once a diagnosis is made, a proper treatment plan can be devised.

Interestingly, orthodontic therapy is not usually necessary because most odontomas are very small and its influence on occlusion is negligible and improvement without orthodontic therapy can take place.[38,39] However, in some cases after extraction of the impacted tooth and removal of the odontoma; orthodontic treatment can be performed to regain the lost space for the successor permanent tooth which should be monitored. If it does not erupt spontaneously, orthodontic traction procedure can be used.

CONCLUSIONS

The earlier detection and removal of odontoma and cystic lesion associated with the impaction of teeth might give better results for achieving good occlusion and obtaining proper function. In addition, using CBCT system in some cases is highly recommended. Dentists should prescribe CBCT imaging only when they expect that the diagnostic yield will benefit the patient care, enhance patient safety or improve clinical outcomes significantly. This technology provides the dental clinician with an imaging modality capable of providing a 3-D representation of the maxillofacial skeleton with a high quality, minimal distortion and low radiation.

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