Formation of supernumerary tooth one year after enucleation of adjacent dentigerous cyst in a 9-year-old boy

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Abstract
Supernumerary tooth is a rare event, which is usually found coincidentally in radiographic examination. The prevalence of this event is 1-3% with different prevalence for primary and permanent dentition. Supernumerary teeth may cause various clinical problems including: delayed or failure of eruption, displacement or rotation of permanent teeth and cyst formation.
The purpose of this study was to present the case of a 9-year-old boy who had a large dentigerous cyst around his primary mandibular left premolar that was enucleated with the tooth. A year after this enucleation, we have observed a supernumerary tooth in mesial of canine. It is a reasonable question that "can the supernumerary tooth formation relate to the dentigerous cyst around impacted tooth?"
Therefore, it is necessary to perform more pathological investigation in this aspect to answer this question.
***Keywords*:** Supernumerary Tooth, Dentigerous cyst, Odontoma, Primary Dentition
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Many young patients are referred for orthodontic treatments every year. It is probable to find some pathologic conditions in clinical examination like pathologic cysts, tumors, etc. Therefore, it is necessary to do comprehensive extra and intra oral examination to find this conditions which can influence treatment plan and prognosis.

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In chronological development of human dentition, there are two series of dentitions: 1- deciduous dentition, 2- permanent dentition. From histologic approach to teeth formation, the primary teeth are made of dental lamina with making of tooth germs and the permanent tooth bud are made from successor teeth of dental lamina but permanent molars are made of the invasion of oral mocusal epithelium backward into ectomesenchyme. Every disorder in this developmental procedure can cause missing or additional tooth. [1]
Supernumerary tooth is a rare event and it is usually found coincidentally in radiographic examination. Prevalence of supernumerary teeth is 1-3 percent of population.[2]

Prevalence in permanent dentition is 0.15% to 3.8% [3-5] but in primary dentition is 0.3–0.8%. [5, 6] Based on previous studies there is no sex difference in primary dentition but there is a tendency toward male in permanent dentition. [5, 7]

There are some theories for supernumerary formation:

Evolutionary throwback: This theory is rejected by Primosch because of ectopic occurrence of supernumerary tooth.[5]

Environmental factors: Such factors cause tooth bud dichotomy.[5]

Hyperactivity: Dental lamina shows hyperactivity independently and in local regions. [3, 5, 8]

Heredity has important rule in supernumerary tooth occurrence. Scientists have been considering some inheritance patterns for supernumerary tooth occurrence:

Autosomal dominant where lack of penetrance in some generations has been reported.[9]

Sex-linked with predominance of male [5]

Recessive genes on the inhibiting X chromosome and the autosome [5]

Multifactorial inheritance [3,5]

In the canine region the occurrence of supernumerary teeth are also rare and their form is usually supplemental when they occur. Single supernumeraries occur in 76–86%, double supernumeraries in 12–23% and multiple supernumeraries in less than 1% of the cases.[5] Some studies reported multiple supernumerary teeth in approximately 14% of the subjects that they have studied. [5,6,10]

Hyperdontia can be associated with some syndromes of which the following list is the most common: cleft lip and palate, cleidocranial dysostosis[11], Gardner's syndrome [12] and Less common of them are Fabry Anderson's syndrome[13], Chondroectodermal dysplasia (Ellis–Van Creveld syndrome)[14], Ehlers– Danlos syndrome [15], incontinentia pigmenti and Trico–Rhino–Phalangeal syndrome [5].

The purpose of this report was to present a case with a dentigerous cyst in which an extra tooth was formed one year after complete cyst enucleation.

Case Report

A 9- year-old boy referred to our clinic for orthodontic therapy, with a complaint of teeth mal alignment. In clinical examination, a moderate swelling found around primary mandibular region of left molar. On the panoramic image, a radiolucency was seen around root furcation of primary mandibular left first molar that involved tooth bud of permanent mandibular left first premolar (Figure 1). The molar was extracted with enucleation of cyst and the tooth bud. Pathologic study indicated that it was a dentigerous cyst.

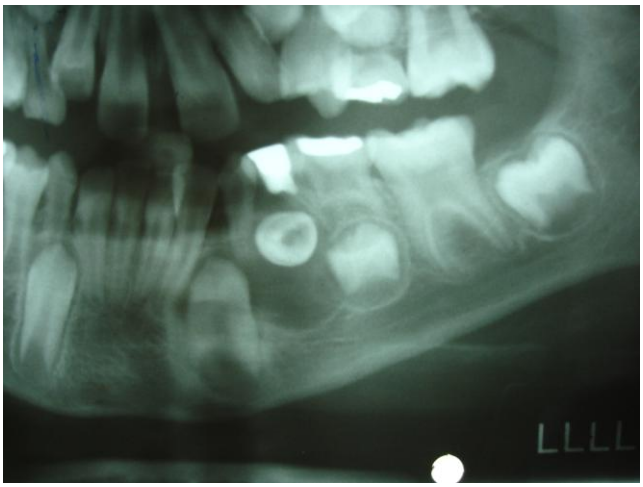


Figure 1: Radiolucency around root furcation of primary mandibular left first molar that involved tooth bud of permanent mandibular left first premolar before enucleation

During an orthodontic treatment and due to displacement of a canine, a radiographic image was taken after one year. Surprisingly, a new radio opaque mass was

found on the image with radiolucent rim around it that was formed in mesial of permanent mandibular left canine (Figure 2). This mass seemed to be an odontoma and since the orthodontic treatment plan recommended enucleating of this mass, we were forced to extract this extra tooth which had normal shape of a natural teeth. Pathologic study showed that it was a compound odontoma.

Six months after enucleation of supernumerary tooth the patient had no problem, canine was came back to its ideal region and patient was under orthodontic treatment until now.

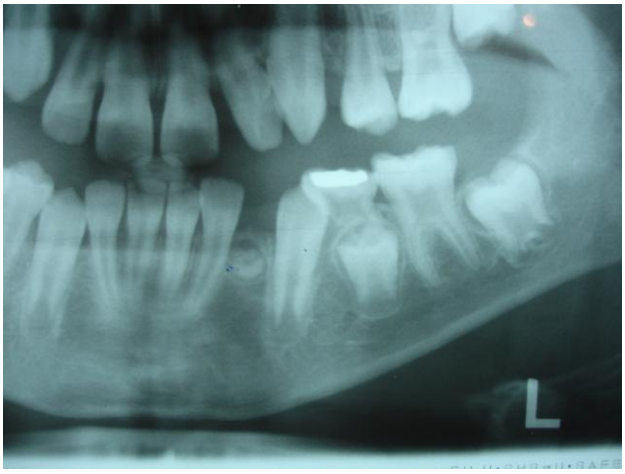


Figure 2: Supernumerary tooth in the mesial of permanent mandibular left canine one year after enucleation of dentigerous cyst

Discussion

Supernumerary teeth usually form in age of 7 to 34. They can be seen in radiographic examination.[16] The age interval of extra tooth formation matches with our case. Most of cases with one extra tooth take place in upper anterior and molar region [3,5] but it is rare to see an extra tooth in mesial of canine [5]. However, we saw this event in our case. There are three types of supernumerary teeth based on their locations: Mesiodens, Paramolar, Distomolar.[5] The most common type of supernumerary is mesiodens. [17]

Supernumerary tooth can have various morphologies in permanent dentition: conical, tuberculate, supplemental, odontoma.[5] If we consider this calcified mass as an odontoma, the probability of its formation during first two decades of life is more than other time. The average age of diagnosis is 14 years. [18]

Supernumerary teeth may cause various clinical problems including: delayed or eruption failure, displacement or rotation of permanent teeth, abnormal root formation or resorption of adjacent tooth root, cystic formations (about 5% of dentigerous cysts involve supernumerary teeth [19]), crowding and eruption into the nasal cavity [3, 5, 6, 20, 21].

Because of the aforementioned probable complication, we need to decide whether or not an unerupted extra tooth should be removed. The most desirable time for extraction is after completion of adjacent tooth root.[5,6] In adverse, if we choose to abandon it in its place (because it is symptomless and does not affect the dentition) fallow-up of the patient is recommended.[5]

In our case, one year before formation of extra tooth in mesial of canine, there was a large cyst around permanent mandibular first premolar that was enucleated but one year after surgery we observed an odontoma in aforesaid region. In basis of these evidences, one may ask: "Can the supernumerary tooth formation be correlated with the dentigerous cyst around impacted tooth?"

The following three reasons make us think that formation of supernumerary teeth is related to dentigerous cyst:

Supernumerary tooth was not seen one year before when dentigerous cyst was seen.

The canine follicle was seen to have relation to dentigerous cyst in panoramic radiography.
There is possibility of stimulation of residual epithelial cells because of surgical approach for enucleating dentigerous cyst.

Conclusion

With considering, supernumerary tooth effects on dentition. It is necessary to perform more clinical and pathological investigations and more cases in this aspect to answer the above question.

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