

Gemination of Primary Canine with Congenitally Missing Primary Central Incisors

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ABSTRACT

Aim: To differentiate between gemination and fusion as both are consequences of the developmental anomalies resulting in the formation of a wide tooth, difficult to differentiate clinically.

Introduction: Gemination is often confused with fusion. Fusion occurs when two tooth buds unite, while gemination is said to occur when one tooth bud tries to divide. Various terms, such as double tooth, connation, linking tooth, synodontia, and shizodontia are also used for describing fusion or gemination.

Case report: This article presents the case report of a 6-year-old girl with an asymptomatic wide primary canine present in the right mandibular arch.

Conclusion: The tooth was finally diagnosed as gemination, although clinical features suggested fusion, but radiographic evaluation led to gemination.

Clinical significance: Gemination ranges from 0.5 to 2.5%. Early and correct diagnosis of such cases helps clinician in the proper treatment planning and avoiding of complications.

Keywords: Developmental anomaly, Fusion, Gemination, Primary teeth.

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INTRODUCTION

Developmental anomalies of dentition can be classified into various categories which are based on the shape, size, structure, or number. Gemination and fusion both are developmental anomalies in shape of dentition. Various terms, such as double tooth, connation, linking tooth, synodontia, and shizodontia are also used for describing fusion or gemination.¹

Gemination can be defined as a teeth anomaly that arises from an attempt at division of a single tooth germ by an invagination, with the resultant incomplete formation

of two teeth.² If the division is complete and results in two equivalent teeth, it is known as twinning, which results in one normal and one supernumerary tooth. Fusion is defined as the union of two normally separated tooth germs. Fusion may be complete or incomplete depending on the developmental stage of teeth at the time of fusion.²

Clinically, it is difficult to differentiate between fusion and gemination as both anomalies result in similar wide teeth, but it has been suggested that full complement of teeth indicates germination, while one tooth less than normal indicates fusion. However, if the fusion involves supernumerary tooth, then it might be confused with the gemination. Similarly, if gemination occurs in arch with hypodontia, it is difficult or almost impossible to differentiate it from fusion.³ Radiographs are helpful in differentiating fusion and gemination. Geminated teeth will have single pulp chamber and single root canal, whereas fused teeth will have two different root canals and pulp chambers.⁴

The etiology of gemination and fusion is not known although trauma has been suggested as one of the possible causes, and both the conditions also show familial tendency.^{5,6} Gemination has been observed in both primary and permanent dentitions with a slight predilection seen in primary dentition.⁷ The incidence of gemination and fusion ranges from 0.14 to 5.0% with no sex predilection, but the prevalence of gemination and fusion in primary dentition ranges from 0.5 to 2.5%.⁸

This report presents a case of asymptomatic geminated tooth in a mandibular arch.

CASE REPORT

A 6-year-old girl child reported to the Department of Pediatric and Preventive Dentistry, with her mother with the chief complaint of dark-pigmented gingiva. Since this was the patient's first visit to a dental setup, all the necessary behavior protocols were maintained so as to alleviate any fearful concerns that the patient may have. A complete detailed history of the patient was evaluated with specific regard to medical and family history, which were noncontributory. Dental history was significant as the patient reported the absence of teeth in the anterior mandibular arch since birth. Extraoral examination revealed normal findings. Intraoral hard tissue examination of the child revealed normal set of dentition corresponding to her age with the absence of primary mandibular central

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Fig. 1: Clinical photograph of geminated primary canine

incisors. Another finding during the intraoral examination was the presence of a large canine in the right side of the mandibular arch with a groove extending on the both labial and lingual aspects until the middle third of the crown, which gave the appearance of two joined teeth or double teeth (Fig. 1). The intraoral soft tissue examination exhibited healthy, but deeply pigmented gingiva. The oral hygiene status of the patient was also good with no caries and healthy gingiva. Intraoral periapical (IOPA) radiographs of the edentulous mandibular anterior region and canine region were advised to diagnose the case. The IOPA of mandibular anterior region revealed missing primary central incisors, whereas the permanent central incisors were correctly developing (Fig. 2). The radiograph of canine revealed two crown-like structures joined together with one common root and pulp canal (Fig. 3). The clinical features and the radiographic findings complemented the diagnosis of gemination of canine with congenitally missing primary mandibular central incisors. As the geminated tooth was neither causing any space concerns nor any esthetic complications, it was explained to the patient, and the tooth was kept only for further observation. Since the patient had primarily reported for correction of dark pigmentation of gingiva, the LASER protocol for

depigmentation was explained to the patient. The parents were not willing for the treatment as explained and wanted some more consultation before deciding finally. This case report presents a rare finding of geminated primary canine with congenitally missing primary mandibular central incisors, diagnosed as serendipity.

DISCUSSION

Gemination and fusion are two different morphological dental anomalies, which are characterized by the formation of a wide tooth. Despite numerous cases reported in the literature, differentiating between these anomalies is difficult. A proper case history with clinical and radiographic examination provides the required information for diagnosing such anomalies.⁷ After evaluation of all the gathered information, the present case report represents gemination of a primary canine with congenitally missing primary mandibular central incisors.

If the abnormal tooth is counted as one in the dental arch and the number of teeth present is normal, then it is termed as gemination, whereas if the number of teeth present in dental arch are less than normal, then the term fusion is considered. This is a practical way for differentiating between gemination and fusion, which is known as Mader's "two tooth" rule.³

Pulpal anatomy is also useful in differentiating gemination and fusion. Gemination results in the formation of equal images of the coronal half, whereas fusion takes place at an angle causing crooked appearance. Geminated tooth shows a single pulp chamber and single root canal, whereas fused teeth have separate pulp chamber with two roots or two root canals in a single root. Gemination usually leads to crowding, whereas fusion causes ectopic eruption.⁴

In the present case, the total number of teeth present in the dental arch was less than normal, thus suggestive of fusion clinically, but no such anomaly was present on

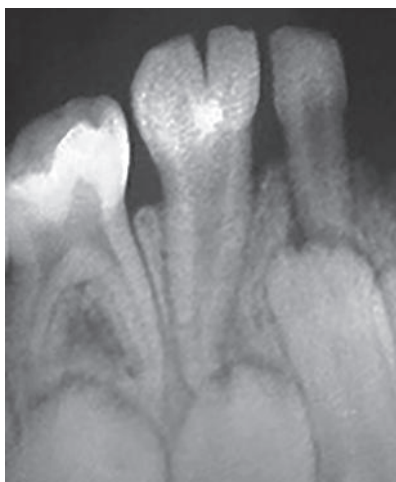


Fig. 3: Radiograph of geminated primary canine

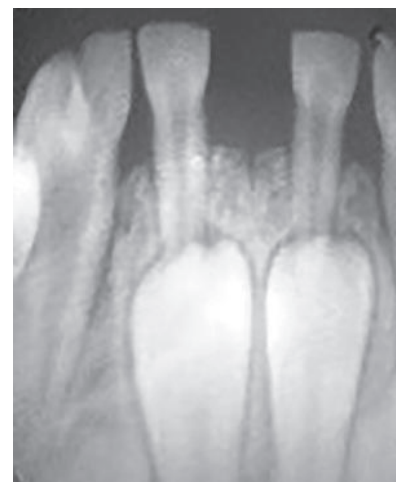


Fig. 2: Radiograph of permanent successors

the other side of the arch as both of the central incisors were missing in the mandibular arch. On the radiographic examination, the primary canine had single pulp chamber and single root canal, which indicates geminated tooth.

Gemination and fusion are dental anomalies with close similarity inherited by different etiologies. These anomalies develop during tooth bud morphodifferentiation due to developmental disturbances of both the ectoderm and mesoderm.⁹ Gemination and fusion occur more often in primary dentition than in the permanent dentition with more prevalence in the mandibular anterior region between lateral incisor and canine. The unilateral occurrence of gemination and fusion is more commonly seen than the bilateral.⁸ In this case also, unilateral gemination is seen in the anterior region involving canine.

Although there is extensive literature present on the occurrence of gemination and fusion, nomenclature is a matter of concern. Many authors differentiated them by counting the teeth, and by observing the root morphology, some used gemination and fusion as synonyms, and some authors simply call the phenomenon as “double tooth” or “connoted tooth,” for avoiding confusion over terminology.^{10,11}

Aguiló et al¹² classified double tooth using both the clinical and radiographic appearances as criteria and guide into four morphological types (Table 1).

Based on Aguiló et al's¹² classification, the present case of geminated tooth can be classified under type II as the large crown, and large root was present with a groove.

As the gemination is seen more in the primary dentition as compared with permanent dentition, this has an effect on the succedaneous dentition, such as delayed exfoliation of the affected teeth because of greater root mass and increased root surface area. If deep grooves are present, the possibility of bacterial plaque accumulation in fissures and grooves of these teeth increases,

which makes them susceptible to caries and periodontal disease.¹³

Proper oral hygiene should be maintained by the individual so that not much of the bacterial plaque accumulates in fissures and grooves. Sealants application and resin restorations in deep grooves and fissures will further reduce the risk of caries in these teeth. In the present case, the patient was advised for regular follow-up after explaining the caries risk associated with the tooth, and proper oral hygiene instructions were given.

CONCLUSION

Diagnosis and management of geminated teeth have always been present as a challenge to the clinician. By the use of careful examination by clinical and radiographic methods, gemination and fusion can be diagnosed and differentiated. A thorough knowledge must be present regarding the complexity of root canal morphology to avoid any complications.

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Table 1: Morphological types of double tooth

Types	Criteria
I	A single bifid larger-than-normal crown with a notch on the incisal edge A bifid pulp chamber Normal-sized root and radicular canal with widening in the cervical portion
II	Large crown and a large root: a larger-than-normal crown usually with a groove or notch, a single large pulp chamber A root that is larger than normal along its length and one large shared root canal
III	Two fused crowns with a double conical root
IV	Fused crowns, double roots, two (or more) clearly distinct, but joined roots with two separate canals