

## Bilateral fusion of permanent mandibular central and lateral incisors: A case-report of a rare developmental anomaly

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### Abstract

Fusion and gemination are two separate clinical entities describing two different morphological and developmental anomalies involving a characteristic large crown that may appear clinically similar. Fusion arises when two normally separated tooth germs fuse or join together during the initiation or the morphodifferentiation stage of tooth development resulting in a single enlarged tooth structure with confluence of dentin, instead of two normal teeth. Although a variety of appearances are noted in both of the anomalies but Kelly suggested that in gemination the two halves of joined crowns are mirror images while fusion manifests with a distinct differences in two halves of the crowns. The prevalence of fusion in primary teeth is 0.4%-0.9% and in permanent dentition it has been reported to be 0.2% only and bilateral fusion in permanent is even more rare and reported to be 0.05%. According to reviewed literature for bilateral fusion in the permanent dentition, only one case of complete fusion of incisors has been reported so far.

**Keywords:** Fusion, Gemination, Developmental anomaly, Morphological, Tooth germs

### Introduction

Fusion is a morphological dental anomaly that arises when two normally separated tooth germs fuse or join together during the initiation or the morphodifferentiation stage of tooth development resulting in a single enlarged tooth structure with confluence of dentin, instead of two normal teeth.<sup>(1,2,3)</sup> Depending upon the stage of development of the teeth at the time of this embryologic union, Fusion may be either complete (true) or incomplete (partial) with fused or separate root canals.<sup>(1,3,4,5)</sup> Fusion can occur between teeth of same dentition or mixed dentition and also between teeth of normal series and a supernumerary tooth such as mesiodens or distomolar.<sup>(1,4,6)</sup> The etiology of this developmental aberration is unclear and still unknown. The possible causes could be the influence of the physical forces producing close contact between two developing teeth follicles causing fusion of tooth buds or because of the necrosis of the intervening tissue between two close germs, or may be a genetic predisposition.<sup>(1,4,6,7)</sup> This anatomic irregularity can occur in either of the dentition with higher frequency reported in deciduous teeth and is more commonly seen in the anterior region and maxilla.<sup>(1,2,4,6,8)</sup> The incidence of this developmental anomaly is variable. The prevalence of fusion in primary teeth is 0.4%-0.9% and in permanent dentition it has been reported to be 0.2% only<sup>(4,9,10,11)</sup> and bilateral fusion in permanent is even more rare and reported to be 0.05%.<sup>(9,11)</sup> Fusion is often confused with Gemination and there are controversial concepts to correctly differentiate between the two in the literature.<sup>(12,13)</sup> Clinically these two developmental anomalies can be distinguished by a practical method of

counting of teeth in the dental arch as suggested by Levitas.<sup>(11,14,15)</sup> Reduced number of teeth will be seen in fusion if the affected tooth is counted as one whereas in Gemination the number is normal.<sup>(4,11,14,15)</sup> This method is not reliable always, as there is also a possibility of occurrence of supernumerary tooth or congenital missing tooth in a dentition.<sup>(11,14)</sup> Fused teeth are present asymptotically but may create concerns related to aesthetic or malalignment or malocclusion in the arch that may predispose to dental caries and periodontal problems and usually require multidisciplinary approach with expertise in various areas of dentistry to achieve functional and aesthetic success.<sup>(4,6,14)</sup>

This paper reports a rare case of bilateral complete fusion of permanent mandibular central and lateral incisors in a 7 year old boy.

### Case Report

A 7 years old healthy male child patient reported to the department of Pediatric & Preventive Dentistry, with a complaint of pain and sensitivity in relation to 55 for the last 2 days. This was child's first visit to our department and was cooperative in nature. On intra-oral examination, patient was found to be in early mixed dentition stage with deep caries in relation to 55, and faulty and old restorations with 65 and 85 and unsatisfactory oral hygiene. Patient had undergone extraction of 75 few months back by a general practitioner. On careful clinical examination it was noticed that only two incisors were present in the mandibular arch and 32 and 42 were found to be missing. It was also observed that both the permanent mandibular central incisors were abnormally large in

size with increased width mesio-distally. (**Fig. 1**) The patient's medical history was uneventful and was unaware of this dental irregularity and gave no history of any pain or discomfort associated with it. Thorough family history did not reveal any congenital dental anomalies and the accompanied parent had a normal permanent dentition.



**Fig. 1: Intra oral view showing abnormally large Permanent mandibular Central incisors & Missing Lateral Incisors**

On the basis of the clinical findings a preliminary diagnosis of fusion was made. The diagnostic criterion was based on the fact that there were two teeth less than normal complement when the double teeth were counted as one. Panoramic radiographic examination revealed a complete fusion of permanent central and lateral incisors with a single crown and a single root on both sides of the mandible which is an uncommon finding. A confirmed diagnosis of bilateral fusion of mandibular permanent central and lateral incisors was made following the radiographic findings. (**Fig. 2**)



**Fig. 2: Showing complete fusion of 31&32 and 41&42 with large crowns and fused single root and single root canals**

The fused teeth were caries free and hence no treatment was carried out on them. Since 55 had pulpal exposure which was causing pain hence endodontic treatment was started and all other treatment was planned according to clinical requirements. The patient and the parent were informed about the existence of the dental aberration and oriented about the increased risk for development of dental caries and periodontal

problems because of local conditions favouring plaque accumulation.

## Discussion

Fusion and gemination are two separate clinical entities describing two different morphological and developmental anomalies involving a characteristic large crown that may appear clinically similar.<sup>(6,8,10)</sup> Despite considerable amount of reported cases of fusion and gemination, many researchers find the differential diagnosis between these two anomalies very difficult and confusing,<sup>(6,8)</sup> and disagreement exists regarding the nomenclature. Some authors use the Madder's two tooth rule to classify the double teeth.<sup>(16)</sup> According to this rule, in Fusion the number of teeth count is reduced when the double teeth is counted as one, and in Gemination the number remains same if the affected teeth are counted as one.<sup>(16)</sup> Exception are in cases where the fusion occurs between a normal tooth and a supernumerary tooth or in cases where there is congenitally missing tooth in an arch.<sup>(11,14,17)</sup> Although a variety of appearances are presented in both the anomalies and according to Kelly, in gemination the two halves of joined crowns are mirror images while fusion manifests usually with a distinct differences in two halves of the crowns.<sup>(18)</sup> Fusion is a rare anomaly and may be either complete or incomplete depending upon the stage of tooth germs when the union occurred.<sup>(1)</sup> Prevalence of bilateral fused teeth is less frequent and ranges from 0.5% to 5% based on geographic, racial and genetic factors.<sup>(4)</sup> According to reviewed literature for bilateral fusion in the permanent dentition, only one case of complete fusion of incisors has been reported so far.<sup>(9,11)</sup> Furthermore 100% of permanent bilateral fusion cases are seen in maxilla involving incisors and 83% of them involve supernumerary teeth.<sup>(10)</sup> Radiographically the Fusion anatomy may range from separate pulp chambers and root canals to a common root canal systems.<sup>(19)</sup> Hence Morphology and pulpal anatomy are more valuable diagnostic tools for the diagnosis of fusion.<sup>(14)</sup> Considering the various criteria of identifying a fused teeth and after a thorough clinical and radiographic evaluation we came to the conclusion that this case represented B/L complete fusion of the permanent mandibular central and lateral incisors which is an uncommon finding. In the presented case the crowns of 31 and 41 were abnormally large and wide without the presence of any groove on the labio-lingual surface and both the permanent mandibular lateral incisors were missing indicating a complete fusion bilaterally. The morphology exhibited by fused 41-42 and 31-32 was of Type II and was in concurrence to the findings of Aguilo et al<sup>(19)</sup> as the fused crowns were larger than the normal and the OPG Radiographic assessment disclosed a single large root with a large and single pulp chamber in both of the fused teeth.

The patient was not aware regarding this dental anomaly and it was an incidental finding. No treatment was done in relation to fused incisors as patient had no symptoms associated and also was in early mixed dentition stage but was told about the esthetic and orthodontic interventions required in future. The patient was kept under observation.

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