

Incidental finding of two rare developmental anomalies: Fusion and dilaceration: A case report and literature review

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Abstract

A number of developmental anomalies of morphology are there. However, as compared to the more common oral diseases like caries or periodontal problems, they account for a relatively lower number. When present, they may pose various problems of esthetic, function, malocclusion, or possible disposition to other oral problems. Hence, though rare, their timely diagnosis is very vital in proper treatment planning to avoid unseen complications during extractions, endodontic or orthodontic treatment. The present case is of a patient reporting with two very rare developmental anomalies, that is, fusion and root dilaceration, in contralateral sides of the same patient. To the knowledge of the author, reportedly it is the first such case. The terminologies, etiology, and epidemiology of both these anomalies are also discussed.

Key words: Developmental anomaly, dilaceration, fusion, incisors, mandibular, premolar

INTRODUCTION

Various terms have been used to describe dental developmental abnormalities of a shape such as fusion, gemination, concrescence, and dilaceration. The fusion of teeth is characterized by a union of two adjacent teeth resulting in a reduction in the number of teeth in affected arch.^[1] Dejonge (1955) proposed the term “synodontia” for teeth that combine during development.^[2] Gemination is, when there is a division of a single tooth germ by invagination with the resultant incomplete formation of two teeth. The structure is usually one with two completely or incompletely separated crowns that have a single root and root canal.^[3] Concrescence of teeth is a form of fusion, which occurs after root formation has completed.^[3] Dilaceration refers to

the angulation occurring along the crown or amelocemental junction or anywhere along the root.^[4]

The present case report is possibly the first case of occurrence of true fusion of permanent mandibular right central and lateral incisors and root dilaceration in mandibular left second premolar in a patient.

CASE REPORT

A 24-year-old systemically healthy adult male reported with a chief complaint of deposits over his teeth. His medical

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and family history was unremarkable. On examination, the patient had minor plaque and calculus deposits, and a “macrodont” was noticed in the lower anterior region [Figure 1]. The patient was unaware of the same. On closer examination, it revealed a slight groove on the incisal edge lingually. It was also noticed that the mandibular right lateral incisor was missing. A clinical diagnosis of complete fusion of mandibular right central and lateral incisor was made. Another incidental finding was of a slightly discolored mandibular left second premolar [Figure 2]. The tooth was mesially tilted and had cervical caries. Periodontal probing revealed a pocket of 5 mm mesially and a Grade I mobility. There were no periodontal pockets elsewhere. The tooth was otherwise asymptomatic. The contralateral premolar was normal. The intraoral periapical radiograph revealed a completely fused tooth with a single root canal and a slight bifurcation of the pulp chambers [Figure 3]. The panoramic radiograph revealed a dilacerated root of the second premolar at the level of middle thirds with advanced bone loss on mesial aspect [Figure 4]. No other significant radiographic findings were noted. Oral prophylaxis was

advised for the patient, and he was put on regular follow-up for evaluation of any dental caries in the fused teeth. The endodontic opinion was taken for the mandibular second premolar, and the prognosis was poor because of the advanced bone loss, dilacerated root, mobility, and tilted position of the tooth. The patient was informed, but he was not willing for its extraction at that moment.

DISCUSSION

Dental anomalies occur during the embryological and developmental life of the tooth. Fusion results from the union of adjacent tooth germs of developing teeth. It can occur in deciduous teeth or permanent teeth or between a normal tooth and a supernumerary. It is more common in anterior teeth. Depending upon the stage of odontogenesis, it may be either complete or incomplete. If the contact occurs early before the calcification begins, a single tooth of normal size or slightly large tooth may occur. Usually, the crown of such fused tooth has incisal clefts of varying depths. If it occurs later, there may be the union of roots only. However, the dentin is always confluent in cases of true fusion. The tooth may have separate or fused root canals. It can occur unilaterally or bilaterally.



Figure 1: Clinical intraoral view showing a “macrodont”: A fused right mandibular central and lateral incisor



Figure 3: Intraoral periapical radiograph showing true fusion between mandibular central and lateral incisor having a single wide pulp canal and a bifurcated pulp chamber



Figure 2: Clinical view showing an “abnormal” appearing mandibular second premolar



Figure 4: Panoramic radiograph showing a dilacerated mandibular second premolar with advanced bone loss on mesial aspect

There is an extensive literature on fused teeth, but still there is a lot of confusion in its nomenclature. Some authors differentiate fused and geminated teeth by counting the number of teeth in the arch; if the number is less, it is termed “fusion;” if more; it is called “gemination.” However, this becomes invalid, if there is a fusion between a normal tooth and a supernumerary. Some simply use the terminology “double teeth” or “connated teeth.” Mostly literature includes old articles on this anomaly dating back to articles published in 1980s and 1990s. Still, the rarity of this anomaly especially in permanent dentition does not hinder its reporting in the present times, as the present case reports incidental findings of two rare developmental anomalies of morphology in a single patient that too in different teeth. The fused mandibular incisors could be very easily ignored as they were aligned perfectly in the arch with no caries or pitting, nor causing any crowding or diastema.

When the literature was searched, the majority of the articles of fusion discuss clinical or radiographic difficulties in treating them. Kim *et al.* reported an incidence of about 0.1% in the permanent and 0.5% in primary dentition. The data were again from articles in 1980s and 1990s.^[5] de Siqueira also reported the same results with conflicting variation according to gender, age, and race.^[6] Shashirekha and Jena in their survey for dental anomalies with respect to maxillary lateral incisor in Odisha (India) population of 1062 subjects (15-30 years) found the prevalence of fusion to be 0.18%.^[7] There is no gender predilection. Fused teeth have predilection for mandible over maxilla, unilateral (0.05%) over bilateral (0.02%), and deciduous (0.5%) over permanent dentition (0.1%).^[8] The worldwide incidence of fused teeth ranges from 0.14% to 5.0%.^[9] Asian and Asian-derived populations showed a higher prevalence for fused teeth than European and European-derived population.^[10]

The etiology of fusion is not fully understood. It is thought that some physical force or pressure during the development causes necrosis of the epithelial tissue in between, to fuse.^[3] Mitsiadis *et al.* demonstrates that Notch signaling mediated through the Jagged2 gene plays an essential role in tooth development and fusion of teeth.^[11]

The differential diagnosis for fused teeth includes gemination and macrodontia. It is not always possible to differentiate between fusion and germination clinically. The diagnosis can be made based upon the case history, clinical, and radiographic examination.

According to McDonald, gemination (syn. Twinning) is “the attempted division of single tooth germ by invagination during the growth cycle.”^[12] The number of teeth remains unaltered. The radiograph may show one root and one pulp space with two partially or totally separated

crowns. Hence, clinically, the number of teeth is reduced in fusion, except when fusion occurs between a normal tooth and a supernumerary. Tannenbaum and Alling proposed a classification:^[13]

Cleavage of the single tooth: Partial cleavage (true gemination) and complete cleavage (twinning).

Fusion: Two separate tooth germs that fuse during formative stage giving rise to true fusion: Union by enamel and dentin and late fusion: Union by dentine and/or cementum. Late fusion by cementum only is termed as concrescence.

Dilaceration had been considered to originate from the traumatic displacement of already formed hard tissues with respect to the soft tissues. The most widely accepted cause is mechanical trauma to primary tooth resulting in dilacerations of developing permanent tooth. However, this pathogenesis has been questioned. The prevalence of traumatic injuries in primary dentition ranges from 11% to 30%, however, the incidence of dilacerated teeth was disproportionately lower (about 3%) as compared to the traumatic injuries.^[14] Hence, traumatic injuries to the primary dentition are unlikely to account for all cases of dilaceration and especially those of primary teeth themselves. Furthermore, dilaceration is mostly found in posterior teeth, which are not prone to direct trauma.^[15]

Dilaceration can be seen in both dentitions with the lesser incidence in primary dentition and no sex predilection. Most researchers report a greater prevalence in maxillary posteriors with fewer occurrences in anteriors and mandible.^[16] Diagnosis is made radiographically. Dilacerations may occur anywhere along the tooth, but Malcic *et al.* in Croatian population, reported that root dilacerations in incisors, canines, and premolars is most common in apical third; in molars, it is more common within middle thirds of the root and in third molars it is most common within cervical thirds of the root; also, dilacerations were most frequently seen in mandibular third molars (24.1%) and least in mandibular second premolar (1.5%).^[16] Our case presents another peculiarity as it presents dilacerations in mandibular second premolar within middle thirds of the root.

Patil *et al.* in their study, on Indian population studied the prevalence of various developmental dental anomalies on panoramic radiographs. Dilaceration showed a prevalence of only about 0.5% and none of the radiographs of 4133 patient showed fusion or germination.^[17]

According to American Academy of Pediatric Dentistry, calcification of permanent mandibular incisors begin at

the age of 3-4 months, crown completion occurs at 4-5 years of age and root completion occurs at 9-10 years. For mandibular premolars calcification of crown begins at 24-30 months and root completes by the age of 12-14 years. Mandibular incisors erupt between 6 and 8 years and mandibular second premolars erupt at the age of 11-13 years.^[18] The postulated etiology shared by both of these developmental anomalies of shape is trauma during the odontogenesis. As evidenced by the wide gap in the calcification and root completion of these two teeth a common traumatic etiology is unlikely to have caused fusion in mandibular incisors and dilaceration of mandibular premolar.

The present case is a vital addition to the literature as it is possibly the first reported case of true fusion of permanent mandibular right central and lateral incisors and dilaceration of mandibular left second premolar in the same patient. The occurrence of true fusion in mandibular incisors is a rarity as compared to primary incisors. The occurrence of root dilaceration in permanent second premolar is a rarity that too along the middle thirds of the root. The occurrence of these two developmental anomalies of morphology in opposite halves of the arch rules out having a common single traumatic etiology. The present case reports the incidental occurrence of two very rare anomalies forcing researches to further explore the pathogenesis behind them.

Anomalies of dentition pose treatment challenges to the practitioners. Though they are very rare, once present they may pose discrepancy in arch length-tooth size, leading to crowding or spacing; delayed or ectopic eruption, compromised esthetics, various endodontic, periodontal orthodontic complications, or complicated extractions. Hence, an early detection is very important. Earlier the diagnosis, lesser are the risks related to treatment. When such anomalies are found as incidental findings such patients should be followed up for evaluation of any caries or periodontal problems. The present case also cites the occurrence of two very rare anomalies for the first time in a single patient questioning the postulated traumatic etiology as a common factor in causing both of them.

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Conflicts of interest

There are no conflicts of interest.

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