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Incomplete mamelon fusion – A rare developmental anomaly

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ABSTRACT

Dental anomalies affect the shape, size, structure and number of the teeth. Any disturbance, during the developmental stage of a tooth encountered, due to a syndrome, exposure to chemicals, drugs, local physical agents, genetic or an isolated anomaly may be detrimental to the tooth. Lobes are the building blocks of tooth crowns. The labial aspect of a permanent maxillary central incisor develops by a union of three lobes, visible as protuberances on the incisal edge, and are termed mamelons. We present a rare developmental anomaly wherein the distal lobe of the central incisor had incompletely fused with the central lobe forming a deep gaping fissure on the coronal aspect, thus predisposing it to dental caries. The case report discusses the identification, etiology, management and differential diagnosis of such a case.

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1. Introduction

Developmental disturbances of teeth are reported in about 10% of children in industrialized nations whereas in developing countries, the prevalence ranges from 15–20%.[1] A prospective clinical-cum-radiographic study found just 350 dental anomalies on 20,182 Indian patients over the age of 14 years.[2]

The labial lobes in newly erupted permanent incisors present as rounded protuberances called mamelons. Shpack et al.[3] reported a labial cervical vertical groove [LCVG] as an extension of mamelon groove which continued beyond the cemento-enamel junction into the root. To the best of our knowledge, this is the first case highlighting incomplete fusion of mamelons with the defect extending from incisal aspect to the area coronal to the free gingival margin.

2. Case report

A 7-year old boy reported pain in the upper right tooth. Oral examination revealed a retained primary maxillary right central incisor [tooth 51-FDI notation], the root apex of which had fenestrated the labial alveolar plate. The permanent maxillary right central incisor [tooth 11-FDI notation] was distally displaced by the tooth 51. The permanent maxillary left central incisor [tooth 21-FDI notation] revealed a deep

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Fig. 1 – Incomplete lobar fusion of tooth 21 and fenestrated tooth 51.

fissure on the labial aspect corresponding to the junction of middle and distal labial lobes [Fig. 1]. There was no significant developmental or medical history.

A radiograph revealed an irregular radiolucency, restricted to the crown of tooth 21 along with a retained tooth 51 [Fig. 2]. A palatal view revealed a groove at the site of fusion of the two lobes extending till the mid-coronal level [Fig. 3]. Examination also showed a 3.5 mm pocket on the buccal aspect of the tooth 21, likely a pseudo-pocket related to the erupting tooth 21 [Fig. 4]. A glass ionomer cavity liner [3M, ESPE] was applied on the exposed dentin of the labial fissure of tooth 21 and the tooth restored with a flowable composite [Filtek Z350, 3M, ESPE – Fig. 5].



Fig. 2 – A radiograph showing the coronal developmental defect in tooth 21.



Fig. 3 – Intra-oral palatal view.



Fig. 4 – Pseudo-pocket on the buccal aspect of tooth 21.

3. Discussion

Enamel defects primarily occur due to systemic factors [birth-related trauma; malnutrition; metabolic disorders] or local factors [local infection; local acute mechanical trauma]. The enamel defect due to systemic diseases is bilaterally



Fig. 5 – Post-treatment radiograph.

symmetrical[4] unlike the present case where only one tooth was affected. Although in our case, there was no history of trauma or infection during the primary dentition stage, yet the possibilities cannot be ruled out. The children, while acquiring motor skills, are prone to injury which could have been unnoticed by the parents. Moreover, as the tooth 51 was carious infected, probabilities of its counterpart being affected are high. The close anatomic relationship between the developing tooth bud and the apices of overlying primary incisors may have resulted in a defect on the facial surface of maxillary incisors.

The hard tissue formation of a permanent maxillary central incisor commences at 3–4 months of age and enamel is completed by 4–5 years.[5] Nolla[6] classified tooth development into various stages, ranging from stage 0 [absence of crypt] to stage 10 [apical end of root completed]. In the present case, a disturbance of tooth formation must have initiated between stages 2 [initial calcification] and stage 3 [one third of crown completed].

The crowns of teeth develop from primary growth centers known as lobes. The facial aspect of a permanent incisor develops from three facial lobes and the cingulum develops from a single lingual lobe. The three facial lobes are clinically evident as three incisally positioned protuberances known as mamelons demarcated by two developmental grooves at the site of fusion of these lobes. The number of mamelons on incisors vary from 0–6.[7] Fitzgerald et al.[8] developed a 12-grade system for scoring mamelons, ranging from type 1 [no evidence of mamelon expression] to type 12 [four mamelon configuration]. Our case showed a type 8 configuration of mamelons [three mamelon configuration with lobes of similar size] in teeth 11 and 21.

The mamelons are exclusively made up of enamel. With time, they usually wear down after the tooth reaches its functional position. However, they may persist in anterior open bite; may accentuate in KBG syndrome[9] and may vary in Down's syndrome and cleft lip and palate patients.

In the present case, a failure of fusion of mamelons on the labial aspect presented a deep, gaping fissure. Fissures have been referred to as 'structural defects'[10]; 'faults'[11]; and 'developmental linear faults commonly due to imperfect fusion of the adjoining dental lobes.'[12] These fissures/clefts are plaque-retentive habitats. In addition, inaccessibility of the fissure to a toothbrush; inadequate protection by salivary buffers and fluoride may further hasten the spread of dental caries due to wide, open dentinal tubules. It was thought appropriate to seal the fissure with a protective liner and a restorative material so as to obliterate the retentive zone for colonization of microbes and fermentable carbohydrates.

The differential diagnosis of the present developmental anomaly includes LCVG, dens invaginatus and gemination. Shpack et al.[3] observed a LCVG on permanent maxillary central incisors, extending from cervical to the radicular area, presumably as an extension of the mamelon groove. In our case, the defect was restricted only to the coronal two-thirds, thereby ruling out LCVG. Also, the lobes of tooth 21 retained their characteristic morphology, even around the defect.

Dens invaginatus results from an invagination of the enamel organ into the underlying dental papilla during odontogenesis. It is often seen as a mild enlargement or a deep infolding of the cingulum pit, commonly occurring in maxillary lateral incisors. Dens invaginatus was also ruled out in our case as the fissured defect was restricted to the coronal two thirds area. In addition, the gaping fissure was evident on the labial surface.

Gemination is an attempt of a single tooth bud to divide into two by an invagination with incomplete formation of two teeth. The number of teeth remains unaltered with the presence of a solitary root canal which also corroborated our findings. However, in our case, the mesiodistal dimensions of both the permanent maxillary central incisors were within normal dimensions, unlike the wider crowns noted in germination, thus ruling out this condition.

An early detection and prompt treatment of developmental defects minimize initiation and rapid progression of dental caries; improve esthetics; impart psychological wellbeing; and improve personality of children, particularly when maxillary incisors are involved.

Conflicts of interest

The authors have none to declare.

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