Dual Dental Anomalies: Fusion and Talon's Cusp Coexisting in the Mandibular Anterior Region

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Abstract

The fusion of two teeth and the presence of a talon cusp are prevalent developmental anomalies frequently encountered by clinicians. Typically, these anomalies are observed as isolated occurrences and rarely in conjunction with other dental irregularities. Talon cusp predominantly manifests in the maxillary anterior teeth within the permanent dentition, while fusion is more frequently observed in the mandibular teeth during the primary dentition phase. The simultaneous presence of a talon cusp and fusion in the mandibular permanent teeth is exceedingly rare and scarcely documented in the literature. This article delineates an unusual case of the fusion of permanent mandibular central and lateral incisors, accompanied by a talon cusp on the lingual aspect, in an elderly patient, resulting in periodontitis.

Keywords: Anterior teeth, Mandibular permanent teeth, Fusion, Talon cusp.

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Introduction

Fusion is generally defined as the amalgamation of two or more teeth at the crown level. It is prevalent in primary dentition, often involving mandibular incisors, and typically results in a reduced tooth count in the dental arch. Fusion may also be associated with syndromes such as achondroplasia, chondroectodermal dysplasia, focal dermal hypoplasia, and osteopetrosis.[1]

Differentiating fused teeth from gemination can be challenging. Tannenbaum and Alling proposed a classification system to distinguish fusion from gemination and twinning. Fusion of two distinct tooth germs occurs during the formative stage of tooth development and can be categorized into true fusion and late fusion. True fusion involves the union of enamel and dentin, whereas late fusion is characterized by the union of dentin and/or cementum. A late fusion involving cementum is specifically termed concrescence.[2]

The etiology of dental fusion remains incompletely understood. Both genetic predisposition and environmental factors are implicated in the development of this anomaly. Some researchers suggest that fusion results from physical forces bringing developing teeth into contact, leading to the necrosis of the intervening epithelial tissue and subsequent fusion. Environmental factors such as thalidomide embryopathy, fetal alcohol exposure, or maternal hypervitaminosis A during pregnancy can also impact tooth development. [3]

The prevalence of fusion in permanent dentition is approximately 0.2%, while in primary dentition, it ranges from 0.4% to 0.9%. The prevalence of unilateral double teeth is 0.5% in primary dentition and 0.1% in permanent dentition. The meta-statistic for the prevalence of bilateral double teeth is 0.02% in both primary and permanent dentitions. [4]

Talon cusp, also known as dens evaginatus, is a prevalent developmental dental anomaly characterized by an accessory cusp-like structure projecting from the cingulum area or cementoenamel junction of the maxillary or mandibular anterior teeth. [5]This anomalous structure consists of normal enamel and dentin and may contain varying extensions of pulp tissue or lack a pulp horn entirely.[6] Talon cusp is commonly observed in maxillary anterior teeth, with its occurrence in the mandibular dentition being exceedingly rare. It predominantly affects permanent dentition more than primary dentition and is most frequently seen in maxillary lateral incisors (55%), followed by maxillary central incisors (33%), mandibular incisors (6%), and maxillary canines (4%).[7] The prevalence rate of talon cusp ranges from 0.04% to 10% according to the English literature, with a higher incidence in males compared to females.[8]

The precise etiology of the Talon cusp remains elusive, though it appears to involve both genetic and environmental factors. It is hypothesized that the Talon cusp arises during the morphodifferentiation stage of tooth development, potentially resulting from the outward folding of the inner enamel epithelial cells and transient focal hyperplasia of the peripheral cells of the mesenchymal dental papilla. [9] The occurrence of Talon cusp in mandibular anterior teeth is exceptionally rare, and its concomitant presence with fusion is even rarer. This case report elucidates a unique combination of two distinct developmental anomalies with different formation mechanisms occurring in permanent dentition: the fusion of mandibular central and lateral incisors, accompanied by a Talon cusp on the lingual side

Case Report

A 60-year-old male patient presented to the SEGi Oral Health Centre for a routine dental examination. His past medical, dental, and family histories were unremarkable, and he reported no history of orofacial trauma. A general physical examination revealed that the patient appeared to be in good health. Intraoral and extraoral soft tissues were normal upon inspection. During the intraoral hard tissue examination, the permanent mandibular left central incisor exhibited a large crown with a horn-like projection on its lingual surface. A complete fusion of the left mandibular central and lateral incisors, accompanied by a Talon cusp on the lingual side, was observed (Figures 1 and 2). Mild attrition of the incisal edges and Talon cusp was noted in the left mandibular incisors. The fused teeth were positioned normally within the dental arch. Gingival recession was evident on both the labial and lingual aspects of the fused teeth, but there was no evidence of caries or fracture.

Radiographic examination (Figure 3) revealed a complete fusion of two crowns with obliteration of the coronal pulp chamber and the presence of two separate root canals. The crown of the fused teeth exhibited an inverted "V"-shaped radiopaque structure. Vertical interdental bone loss was evident on the mesial and distal aspects of the fused teeth. Based on the clinical and radiographic examination, a final diagnosis of Talon cusp with fusion was established. Following the confirmation of the diagnosis, appropriate treatment was administered. The fused teeth were clinically asymptomatic, and the Talon cusp did not irritate the tongue during speech or mastication, nor did it interfere with occlusion. As there were no clinical issues associated with the fused teeth, the findings were explained to the patient, and necessary periodontal treatment was provided.

Figure 1: Fusion of left mandibular central and lateral incisor

Figure 2: Lingual Talon's cusp in left mandibular incisors

Figure 3: IOPA radiograph showing Fusion & Talon cusp in left mandibular anterior teeth

Discussion

Fusion and Talon cusp are dental developmental anomalies that occur in both primary and permanent dentition. These anomalies may arise during the morphodifferentiation stage of the tooth bud due to developmental aberrations involving both the ectoderm and mesoderm. [10] Disruptions at any stage of tooth development can lead to distinct manifestations, specific to either the primary or permanent dentition. Fusion can involve the union of teeth within the same dentition (primary or permanent) or between a normal tooth and a supernumerary tooth. [11]

The rare concomitant occurrence of fusion and Talon cusp in the same tooth suggests that local hyperactivity of the dental lamina or its remnants may persist from the bud stage through morphodifferentiation. [12] To the best of our knowledge, only nine case reports of Talon cusp with fusion in permanent mandibular incisors have been documented in the literature. In the present case, Talon cusp with fused incisors was observed in an elderly patient, accompanied byperiodontitis.[13]

Talon's cusp, an accessory structure on anterior teeth, protrudes from the lingual or facial crown surface, spanning at least half the distance from the cementoenamel junction to the incisal edge. [14] First identified by Mitchell in 1982 and coined as Talon's cusp by Mellor and Ripa for its resemblance to an eagle's talon, this anomaly was further defined by Mader as a morphologically distinct projection from permanent incisors' lingual surfaces.[15] While typically seen on lateral incisors, our case exhibited this tubercle on the lingual side of fused mandibular teeth, aligning with Mader's Talon cusp criteria. Although Talon's cusp often co-occurs with developmental anomalies like mesiodens or dens evaginatus, its fusion conjunction, especially in mandibular anterior teeth, is exceptionally rare.[16]

The developmental issues linked to fusion can pose significant challenges in terms of aesthetics and malocclusion, particularly when involving supernumerary elements or if carious lesions are present along the divisions between each crown. Additionally, the presence of Talon's cusp can exacerbate these concerns. However, this particular case did not exhibit such complications. Therefore, dental management focused solely on preventive measures against dental plaque buildup and regular check-ups every three months.

Should a clinician encounter issues like malocclusion, aesthetic problems, speech difficulties, or caries associated with fused teeth, appropriate endodontic treatment is recommended, involving obturation of affected teeth followed by their separation and reshaping as necessary. Any sharp edges can be easily smoothed after endodontic procedures. In cases of occlusal interferences, gradual grinding of teeth over two to three appointments, spaced around six to eight weeks apart, is advisable. For cases where aesthetics are a primary concern, root canal treatment followed by a complete crown restoration is indicated. [17]

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