CASE REPORT

Bilateral fusion of permanent mandibular incisors with Talon's cusp: A rare case report

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ABSTRACT
Whenever nature diverts from the "normal or usual" it gives rise to something called "abnormal or unusual," which we call "a Disorder". Fusion of two teeth is a common developmental disorder that is seen by a clinician. However, bilateral fusion along with Talon's cusp is very rarely seen and reported in literature. This article describes a rare case of the bilateral fusion of permanent mandibular central and lateral incisors, along with presence of Talon's cusp on the left fused teeth.

***Key words**: Connation, double teeth, fusion, Talon's cusp*

INTRODUCTION

"Fusion" and "Gemination" are the terms used to describe joint and double formation of teeth. It is not always possible to differentiate clinically between fusion and gemination.

Fusion is generally regarded as a union of two or more hard tissues of two or more teeth, and the number of teeth in the affected arch is usually less than one.[1,2] However, definitive diagnosis is difficult, because a normal tooth can fuse with a supernumerary tooth or a tooth may be congenitally missing.[3] If it occurs early enough in embryonic development, the result may be a tooth of normal or slightly larger than normal size. If it occurs late in the development, the result is the more classic example seen clinically, resulting in hypodontia of that dental arch and the presence of a large tooth, anomalous in form.[4]

Dejonge proposed the term "synodontia" to describe adjacent teeth that combine during development.[5] Incidence of this anomaly is approximately 0.1% in permanent and 0.5% in primary dentition. However, its distribution according to gender, race, and location are conflicting in literature.[6]

Gemination, according to McDonald is "the attempted division of single tooth germ by invagination during the growth cycle".[7] There is usually a normal number of teeth in the arch and a radiograph shows one root and one pulp space with two partially or totally separated crowns. Kelly suggested that in gemination the two halves of the joined crowns are usually mirror images, in contrast to fusion, which manifests with a distinct difference in the two halves of the crown.[8]

Terms such as *double teeth* and *twinning* are commonly used to describe either anomaly.[9]

The etiology is not fully understood. Some believe that this alteration occurs as a result of physical forces that put developing teeth in contact, thus producing necrosis of the epithelial tissue that separates them, leading to fusion.[10,11] Environmental factors have also been implicated in the etiology of fusion. Thalidomide embryopathy may include dental fusion and Knudsen has produced the anomaly in animals treated with trypan blue and high doses of Vitamin A.[12]

The incidence of dental developmental disorders is variable. Kelly statistics, bilateral fusion is less common in permanent dentition than in the primary dentition. Also bilateral fusion in permanent dentition is found more frequently in the maxilla than in the mandible. Furthermore, 100% of the permanent bilateral fusion cases seen in the maxilla involve central incisors and 83% of them involve supernumerary teeth.[9]

The prevalence of connated teeth in permanent dentition is 0.2% and in primary it ranges from 0.4 to 0.9%.[13] The prevalence of unilateral double teeth is 0.5% in the primary dentition and 0.1% in the permanent dentition. The meta-statistic for the prevalence of bilateral double teeth is 0.02% in both primary and permanent dentition.[9]

Talon cusp is also an uncommon dental anomaly in which an accessory cusp-like structure projects from the cingulum area or cementoenamel junction of the maxillary or mandibular anterior teeth into both primary and permanent dentitions. This anomalous structure is composed of normal enamel and dentin and either has varying extensions of pulp tissue inside it or is devoid of a pulp horn.[14]

Talon cusp is a rare dental anomaly, especially when it occurs on mandibular teeth.[15] It affects both sexes either unilaterally or bilaterally. The permanent dentition is more often affected than the primary dentition; the maxillary incisors being the most frequently involved teeth.

The etiology of the Talon cusp remains unknown, but it seems to have both genetic and environmental components. It is believed that the Talon cusp originates during the morphodifferentiation stage of tooth development, where it may occur as a result of the outward folding of the inner enamel epithelial cells, and transient focal hyperplasia of the peripheral cells of the mesenchymal dental papilla.[14] Talon cusp on a fused tooth is a very rare occurrence and only few cases have been reported to date**.**

In recent times, Jeevarathan *et al*., in 2005, presented a rare case of a facial and palatal Talon cusp on the primary maxillary right lateral incisor of a five-year-old girl with bilateral cleft lip.[16] Danesh *et al*., in 2007, also reported a case of fused maxillary central incisor with dens evaginatus as a Talon cusp in which orthodontic treatment involving cusp reduction was done because of forced bite.[17] Ekambaram *et al*., in 2008, also described a rare case report of fusion of the mandibular permanent incisors with labial and lingual Talon cusp.[18]

This case report presents a rare combination of two different developmental anomalies, with different mechanisms of formation occurring in one dentition, that is, bilateral mandibular fusion accompanied by Talon cusp in the permanent dentition. The main aim is to widen the arena of knowledge of the readers and make them aware that such a combination is a possibility. Moreover, these cases may pose treatment problems whenever they interfere with occlusion, speech, or cause trauma to the tongue or become carious, which needs wise judgment and management by the clinician.

CASE REPORT

A 9-year-old boy reported to the Department of Pedodontics and Preventive Dentistry, Bapuji Dental College and Hospital, for routine dental check up. Medical and family history was nonremarkable. The mother reported no medications, illnesses, or complications during pregnancy. There was no reported history of orofacial trauma or disturbances during the "teething" period. The other siblings were also examined and demonstrated no unusual findings.

Informed consent was procured from the parents of the patient before any findings were reported.

On examination intraoral and extraoral soft tissue findings were normal. Complete fusion of the right mandibular central and lateral incisors and incomplete fusion of the left mandibular central and lateral incisors was seen [Figure 1]. Also, a Talon's cusp was noted on the lingual side of the incompletely fused teeth [Figure 2]. The diagnosis of fusion rather than gemination, on the right side, was based on the fact that there were two teeth lesser than the normal complement when the double teeth were counted as one. Radiographic examination [Figures 3 and 4] revealed that the completely fused tooth had two pulp chambers, but a single root canal. The incompletely

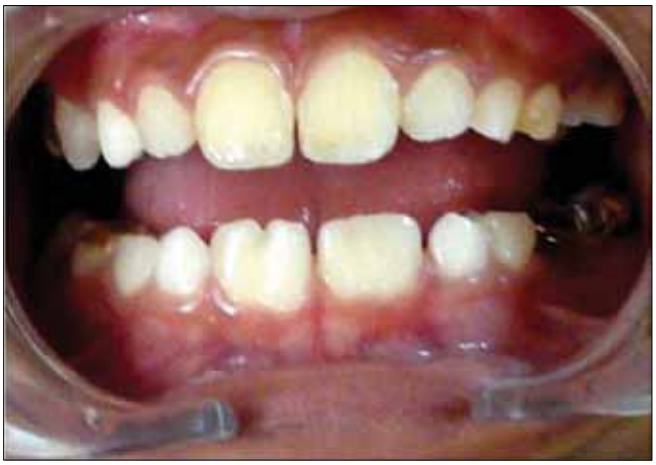

Figure 1: Complete fusion of right and incomplete fusion of the left side mandibular central and lateral incisors

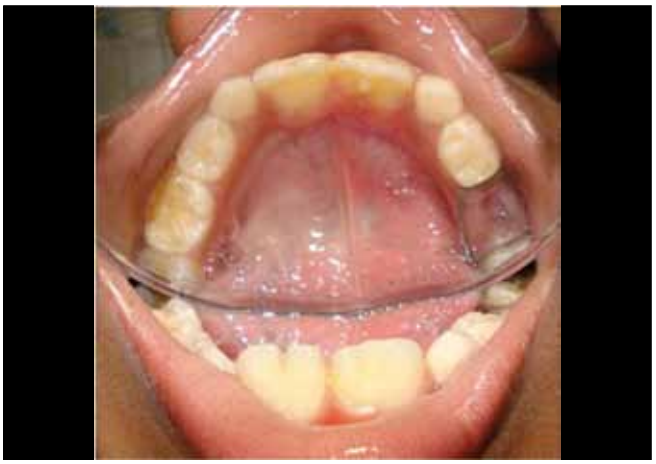

Figure 2: Talon's cusp

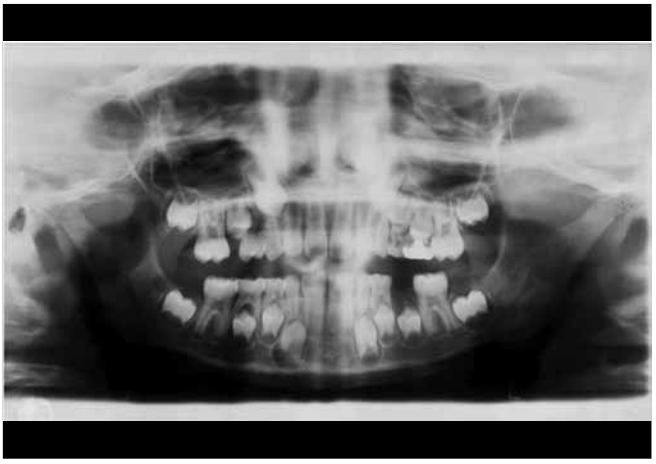

Figure 3: Panoramic radiograph showing a full set of permanent teeth except for the apparent absence of two mandibular incisors

fused teeth (joined by enamel and dentin) had two separate roots with one root having a normal pulp chamber and a canal, while the other root was devoid of the pulp chamber as well as root canal. All other teeth were developing normally.

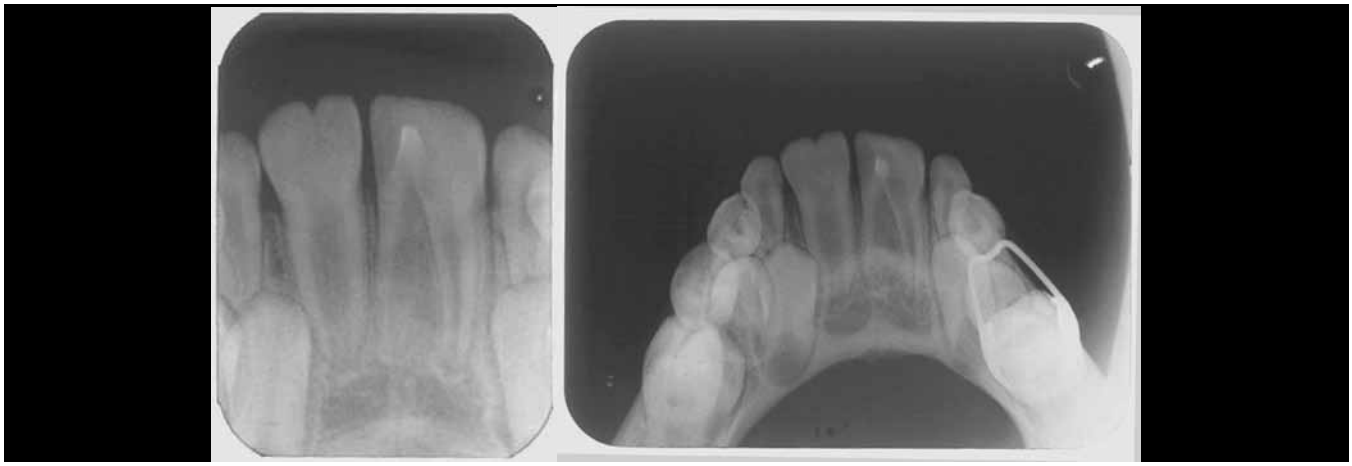

Figure 4: Intraoral periapical and occlusal radiographs. Note, completely fused teeth have two pulp chambers, but a single root canal, and incompletely fused teeth have two separate roots with one root having a normal pulp chamber and canal, while the other root is devoid of a pulp chamber as well as a root canal

No caries was seen in either of the fused pair. All other treatment was completed including extraction of the grossly decayed second primary molar followed by placement of a space maintainer.

DISCUSSION

Although literature on gemination and fusion is extensive, there is still much debate on the nomenclature. Some authors have tried to differentiate them by counting the number of teeth or by observing the root morphology. While some use fusion and gemination as synonyms. Some authors call it as "Double teeth" or "connated teeth" to avoid the confusion.[13]

The case presented could be considered as showing typical clinical characteristics of fusion between each central and lateral incisor because there were less number of teeth in the lower arch. Bilateral agenesis of central/lateral incisors with fusion/gemination of each incisor to a supernumerary contiguous tooth could be a confounding factor leading to the diagnosis of gemination.

Clinical and radiographic examination showed the right side fused tooth had a complete developmental groove between two halves, while the left side tooth showed a complete fusion of the crowns, but had two separate roots, one with the pulp chamber and root canal and the other one devoid of both the pulp chamber and the root canal. This evidence indicates that fusion in the left side occurred later than the fusion on the right tooth.

Another uniqueness of this case report is the presence of Talon's cusp on the lingual side of the incompletely fused (left) tooth. There are no specific criteria describing the Talon cusp, which is a type of developmental dental anomaly. The tubercle that has a different shape and dimension is often named as cingulum hypertrophy. Mader suggests that the term "Talon cusp" should only be used to describe anomalous cusps of permanent incisors that project prominently from the lingual surface of the tooth, are morphologically well-delineated, and extend at least half-way from the cementoenamel junction to the incisal edge.[19] However, Davis reported that when the tubercle is deviated, it is not always necessary to reach the midline, because the tubercle makes a slope to the mesial.[20] Although the lateral incisors are the most frequently affected teeth in the permanent dentition, in the present case, the tubercle localized on the lingual surface of the mandibular left fused tooth, which was considered as a Talon cusp, according to Mader's classification.[19]

Even though mesiodens, microdontia, dens evaginatus on posterior teeth, shovel-shaped incisors, dens invaginatus, or Carabelli tubercule overgrowth have been reported with Talon's cusp, cases of Talon's cusp associated with fusion are very rare.[14]

The developmental concerns relating to bilateral fusion are the same as those of unilateral occurrences. Double teeth may lead to serious problems relating to esthetics and malocclusion, especially when involving supernumerary elements or with the presence of carious lesions along the grooves dividing each crown. Moreover, Talon's cusp can further exaggerate the situation. However, no such problem was noted in this case. Therefore, the dental treatment involved only measures intending to prevent dental plaque accumulation in the risk areas, along with topical fluoride application (with APF gel) and regular follow-up of the patient, every three months.

If a clinician faces any problems like malocclusion, esthetics, speech problems, or caries, associated with the fused teeth, a proper endodontic treatment should be given with obturation of the involved teeth followed by their separation and shaping out in required forms. Sharp edges can also be

smoothened easily after endodontic procedures. If any occlusal interferences are encountered the teeth can be ground in two to three appointments, with an appropriate time period of around six to eight weeks between the two visits.[17]

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