

## Rare Case Report of Gemination and Talon Cusp on Permanent Maxillary Central Incisor

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### **ABSTRACT**

Gemination and talons cusp are relatively rare developmental anomalies, but the occurrence of both in the same tooth/teeth is unique. Till now there are six reported cases of combination of gemination and talons cusp in same teeth/tooth around the globe, present case report is the first one from India. Detecting a dental anomaly and diagnosing is a challenge for the dentist, which requires skill and knowledge. In rare case like gemination and talon's cusp present in the same tooth, early diagnosis and intervention will help to retain the tooth. Prior knowledge about the morphology and history of such tooth anomalies will aid the dentist in ideal treatment planning and help obtain the best results.

### **KEYWORDS**

Gemination; Talons cusp; Diagnosis

### **INTRODUCTION**

Gemination and fusion are frequently encountered in dental practice, yet the diagnosis and management of such cases is always considered challenging. Gemination is “an attempt to make two teeth from one enamel organ”. Subsequently, clinically a tooth having two incompletely or even completely separated crowns, having a solitary root and root canal is observed. This has been explained as incomplete cleavage of complete/true germination, also twinning. This Talon cusp, typically originates at the morpho-differentiation part of tooth development, In Gemination aetiology is unknown, but trauma has been suggested as a possible cause, though familial tendency has been suggested and is seen in both deciduous and permanent dentition [1].

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Gemination or cleavage of a single tooth germ in permanent dentition has aberrant nature of tooth formation and predisposes it to a higher potential for caries, alterations in the dental arch shape, malocclusion, hyper/hypodontia and periodontal disease. The same in primary dentition have more potential for caries, occlusal disturbances and eruptive disturbance of successional tooth. These conditions in both the type of dentitions creates poor aesthetics [2].

Talon cusp seems to be mysterious and express both genetic and environmental causes. It possibly originates as an outcome of outward folding of inner enamel epithelial cells and the transient focal hyperplasia observed in the peripheral cells of mesenchymal dental papilla. The talon cusp can be an isolated incidence or

seen in association with other dental anomalies such as peg-shaped lateral incisor, shovel-shaped incisors, complex odontomes, megadont, agenesis or impacted canines, mesiodens, exaggerated cusp of carabelli, dens invaginatus and dens evaginatus of posterior teeth [2].

The combination of talon cusp with gemination in permanent dentition has been a rare anomaly, with four cases reported in the literature [3-8]. This paper highlights the importance of diagnosing a rare combination of gemination and talon cusp in left permanent central incisor tooth.

### **CASE REPORT**

An 8-year-old male reported to the department of paediatric and preventive dentistry complaining of huge, unpleasant upper left front tooth with irritation to the tongue, food impaction and bleeding gums from 4 months.



**Figure 1:** Frontal occlusal view on initial presentation showing bifid, large and malposed geminated maxillary left central incisor.

Child appeared moderately built and nourished on general examination. Intraoral examination revealed marginal gingivitis in the anterior region and a bifid crown in relation to the maxillary left central incisor was observed. The mesiodistal crown diameter was 2.1 mm larger than the adjacent right central incisor. The crown height measuring 8.2 mm and not fully erupted. The partially split crown of the left maxillary central incisor was noted to have a notch on its incisal edge which extended labiolingually to the middle of the crown

(Figure 1). The maxillary incisors were observed to be rotated with left central incisor placed labially. Palatal aspect of left central incisor, the crown showed a prominent, well-defined additional cusp, originating from the cementoenamel junction and extending till 0.5 mm of the incisal edge. The talon cusp was pyramidal in shape and seen on the mesial part of the crown, with the cusp tip attached to the crown.

A periapical radiograph (Figure 2) exhibited a V-shaped radiopaque structure projected on the image of the affected crown, with the tip of the "V" directed towards the incisal edge. The talon's cusp was delineated by 2 distinct white lines converging from the cervical area of the affected tooth, and extending towards the incisal edge. Pulp extension could be tracked radiographically to the middle of the cusp. The geminated-talonized tooth had a one large pulp chamber, one root and bifid crown appearance. A final diagnosis of talon's cusp on geminated left maxillary permanent central incisor was made based upon sound clinical and radiographic findings.



**Figure 2:** Periapical radiograph showing talon cusp outlined by two white lines representing the enamel, with pulp horn extending to the middle of the cusp.

### **DISCUSSION**

A disorder of growth or development in the anatomical structures that results in anything different from normal is called developmental anomaly [9]. Developmental anomalies manifest from birth. Variations in the shape and number of teeth are seen in both the primary and

permanent teeth. Fusion and gemination are two different dental anomalies characterized by formation of clinically wide tooth [10,11].

Unilateral gemination is known to have a prevalence rate of 0.5% in deciduous and 0.1% permanent teeth. Bilateral cases are observed in 0.01% to 0.04% of primary teeth and in 0.02% to 0.05% of permanent teeth [12]. Prevalence of talons cusp in deciduous teeth is 3.27% and in permanent teeth is 7.7% in Indian population. Most commonly it affects the anterior teeth with gemination observed more in maxillary arch and fusion in the mandibular arch. This aberrant shape originates from a minor notch in the incisal edge of an unusually

wide tooth, to assume the appearance of almost two separate crowns in both the sexes with an equal sex predilection [13,14].

Heredity, trauma, environmental factors and evolution are thought to assume a role in germination [15]. Other causes considered for gemination are ionizing radiation, excessive ingestion of medicines, infectious inflammatory processes, endocrine disturbances, and nutritional deficiency [12]. Syndromes such as chondroectodermal dysplasia and a chondrodysplasia, may also display this anomaly [16]. It is well known that gemination is instigated by an interaction between a variety of genetic and environmental factors [17].

| S. No. | Reported Authors/Year | Age and Gender of the Patient | Place     | Unilateral/Bilateral | Affected Teeth/Tooth                     |
|--------|-----------------------|-------------------------------|-----------|----------------------|--|
| 1.     | Cullen CL et al, 1985 | 8-Years Old and Male          | Australia | Unilateral           | Right Maxillary Central Incisor          |
| 2.     | Al-Omari MA, 1999     | 8-Years Old and Female        | Jordan    | Unilateral           | Right Maxillary Central Incisor          |
| 3.     | Hattab FN, 2001       | 9-Years Old and Male          | Doha      | Unilateral           | Left Maxillary Central Incisor           |
| 4.     | Gündüz K, 2006        | 11-Years Old and Male         | Turkey    | Unilateral           | Right Maxillary Central Incisor          |
| 5.     | Tomazinho FS, 2009    | 28-Years Old and female       | Brazil    | Unilateral           | Right Maxillary Central Incisor          |
| 6.     | Sener S, 2012         | 17-Years Old and Male         | Turkey    | Bilateral            | Right and Left Maxillary Central Incisor |
| 7.     | Present Case          | 8-Years Old and Male          | India     | Unilateral           | Left Maxillary Central Incisor           |

**Table 1:** Details of reported cases of combination of gemination and talon cusp in literature, including the present case.

A minuscule asymptomatic talon's cusp requires no modification. Large talon's cusp could cause clinical issues including occlusal interference, irritation of the tongue during the speech and mastication, pulpal necrosis, periapical pathosis, displacement of the affected tooth, carious lesion in the developmental grooves that delineate the cusp, periodontal problems due to excessive occlusal forces and attrition of the opposing tooth [18]. Further treatment of associated dental complication is inclusive of aesthetic management involving grinding of the talon cusp, fissure sealing, and composite resin restoration. Orthodontic management may be necessary in case of tooth displacement or malalignment of the same or opposite tooth [4,19].

In the past 3 decades, total of 6 cases [3-8] have been reported similar to this rare combination of germination and talons cusp in a permanent tooth (Table 1). Out of them 5 [3-7] was seen unilaterally and one [8] bilaterally, all of them presenting in maxillary permanent central incisor. The cases reported where from Australia [2], Jordan [4], Doha [5], Turkey [6,8], Brazil [7]. The present case is seventh case to be reported and the first one from India.

The treatment option of such combination of anomalies are more of aesthetic concern and functional if the talons cusp is interfering in occlusion. In the present case, the geminated crown was bifid and was extending into the root canal chamber as seen in Figure 1, talons cusp was

interfering with the occlusion. Hence the treatment plan included pupal treatment followed by aesthetic crown

A rare combination of anomaly present can be challenging to the clinician, while diagnosing and planning the treatment. The early diagnosis and timely

management of such developmental anomalies would conserve time in restoring the aesthetics and function of the Tooth/Teeth. Knowledge about the morphology and history of such tooth anomalies will aid the dentist in ideal treatment planning and help obtain the best results.

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