An Unusual Case of Talon Cusp on Geminated Tooth

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Abstract

A rare case of talon cusp on geminated permanent central incisor is described. These developmental anomalies cause clinical problems including unsightly dental appearance, occlusal interference, displacement of the affected tooth, attrition, periodontopathy, irritation of the tongue, loss of space and malocclusion. Clinical and radiographic characteristics of these anomalies and modes of treatment are presented. Recognition of this condition and early diagnosis are important to avoid complications.

MeSH Key Words: *case report; child; incisor/abnormalities; tooth crown/abnormalities*

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The talon cusp, or dens evaginatus of anterior teeth, is a relatively rare developmental anomaly characterized by the presence of an accessory cusplike structure projecting from the cingulum area or cementoenamel junction of the maxillary or mandibular anterior teeth in both the primary and permanent dentition. This anomalous structure is composed of normal enamel and dentin and either has varying extensions of pulp tissue into it or is devoid of a pulp horn.[1-4] In its typical shape, the anomaly resembles an eagle's talon,[2] but it could also present as pyramidal, conical or teat-like.[1-5]

The prevalence of talon cusp varies considerably among populations, ranging from 0.06% to 7.7%.[6,7] In addition to the ethnic variation, the lack of precise criteria to classify an accessory cusp as a "talon" has contributed to the extensive variations in prevalence.[1] The permanent dentition is affected more frequently than the primary dentition, and the anomaly is more common in males than in females.[1,4,5,8,9] Almost 92% of the affected (taloned) teeth in the permanent dentition have been found in the maxilla, with the lateral incisors being the most frequently involved (55%) followed by the central incisors (36%) and the canines.[1,9]

The etiology of talon cusp is not well understood, but appears to have both genetic and environmental components.[1,4] Similar to other abnormalities of tooth shape, talon cusp originates during the morpho-differentiation stage of tooth development. It may occur as a result of outward folding of inner enamel epithelial cells and transient focal hyperplasia of the peripheral cells of mesenchymal dental papilla. The talon cusp can occur as an isolated finding or in association with other dental anomalies such as peg-shaped lateral incisor, agenesis or impacted canines, mesiodens, complex odontomes, megadont, dens evaginatus of posterior teeth, shovel-shaped incisors, dens invaginatus and exaggarated Carabelli cusp.[1-5] The talon cusp has not been reported as an integral part of any specific syndrome, although it appears to be more prevalent in patients with Rubinstein-Taybi syndrome, Mohr syndrome, Sturge-Weber syndrome, incontinentia pigmenti achromians and Ellis-van Creveld syndrome.[1,8,10]

Geminated teeth are developmental anomalies of tooth shape that arise from an abortive attempt by a single tooth bud to divide, resulting in a bifid crown. They are found more frequently in the primary than in the permanent dentition, with a prevalence of approximately 1% and 0.1% respectively in Caucasian groups.[11-13] There seems to be no gender differences in occurrence. Gemination, however, is most often seen in the maxillary primary incisors and the canines.

The etiology of geminated teeth remains unknown. Spouge suggests that the condition may result from trauma to the developing tooth bud.[14] Evidence from case history studies suggests that the anomaly exhibits a hereditary

tendency, similar to that affecting the dental lamina and resulting in hyperdontia.[15] The mode of inheritance is probably either autosomal recessive or dominant with very little penetrance.[12] It appears that gemination is caused by complex interactions among a variety of genetic and environmental factors.

Talon cusp on geminated tooth is a very rare finding. A review of the literature revealed only 2 previous reports.[16,17] The purposes of this article are to present a case of talon cusp on geminated maxillary central that caused clinical problems and to describe treatment modalities.

Case Report

A 9-year-old Jordanian-Arab boy presented to the dental clinic complaining of large, unsightly maxillary central incisors, irritation to the tongue, incising problems, food impaction and bleeding gums.

The patient was the sixth of 7 siblings of parents with no history of consanguinity. No other member of the family was affected by similar dental anomalies. The patient appeared healthy and of normal physical development for his age. There was no reported history of orofacial trauma.

Intraoral examination revealed gingivitis in the anterior region. The occlusion was a Class I molar relationship. In this mixed dentition, the following permanent teeth were erupted: the first molars, the maxillary central incisors and the mandibular incisors. The maxillary central incisors were rotated, and the left central incisor was labially displaced, with medial diastema measuring 5.3 mm (Fig. 1).

The maxillary left central incisor had a large and bifid crown with talon cusp on the palatal aspect. The mesiodistal crown diameter was 2.4 mm larger than the adjacent right central incisor (11.1 mm vs. 8.7 mm) and 20% larger than its counterpart in the normal population (average 8.9 mm, range 7.1 mm to 10.3 mm).[18] The tooth was not fully erupted, with crown height measuring 8.6 mm. The crown of the taloned tooth was partially split and had a notch on the incisal edge that extended labiolingually to the middle of the crown (Fig. 1). On the palatal aspect, the crown exhibited a pronounced, well-defined accessory cusp extending from the cementoenamel junction to within 0.5 mm of the incisal edge. The talon cusp was pyramidal in shape and located on the mesial half of the crown, with the tip of the cusp attached to the crown (Fig. 2). The cusp measured 4.5 mm in length (incisocervically), 3.3 mm in width (mesiodistally) and 3.1 mm in thickness (labiolingually). Noncarious developmental grooves were present at the junction of the talon cusp and the palatal surface of the tooth. The distal groove was deep and packed with dental plaque. The affected tooth responded normally to electric and thermal pulp tests. A periapical radiograph (Fig. 3) showed a V-shaped radiopaque structure superimposed on the image of the affected crown, with the point of the "V" toward the incisal edge. The talon cusp was outlined by 2 distinct white lines converging from the cervical area of the affected tooth toward the incisal edge. Pulp extension could be traced radiographically to the middle of the cusp. The geminated-taloned tooth had a single enlarged pulp chamber, one root and bifid crown appearance. An occlusal radiograph revealed the presence of lateral incisors, with the affected tooth impeding the eruption of the adjacent lateral incisor. Based upon clinical and radiographic findings, a diagnosis of talon cusp on geminated tooth was made.

After diagnosis, it was decided to extract the mobile left primary lateral incisor, which, with the anomalous central incisor, formed a site for food impaction and plaque accumulation (Fig. 2). Approximately 1 mm of the talon cusp was ground off, without exposing the pulp, to eliminate the source of tongue irritation and occlusal interference. The ground surface was treated with fluoride varnish (Duraphat, Woelm Pharma Co., Eschwege, Germany), as a desensitizing agent. The mesial and distal aspects of the affected tooth were reduced 1 mm on each side to enhance esthetics and to create a space for eruption of the left lateral incisor. The notch in the crown was restored with composite resin.

The patient was scheduled to complete reduction of the talon cusp on 2 consecutive appointments of 6 to 8 weeks apart to allow deposition of reparative dentin for pulpal protection and to avoid pulp exposure. Meanwhile, a sectional fixed orthodontic appliance was implemented for alignment of the maxillary central incisors and reduction of the medial diastema. After 2 sessions, the talon cusp was essentially removed, without exposing the pulp or compromising the vitality of the tooth (Fig. 4). Three months after orthodontic treatment, alignment of the maxillary right central incisor was complete and the medial diastema had been reduced to approximately 2 mm. The maxillary right central incisor was enlarged by placing composite resin on the mesial aspect of the tooth, yielding a mesiodistal crown width of 9.2 mm. Treatment for 5 months resulted in marked improvement in the size, shape and position of the central incisors as well as enhancement of periodontal health and appearance (Fig. 5). The patient was scheduled for subsequent orthodontic assessment for the palatally erupting maxillary left lateral incisor.

Discussion

Talon cusp is an odontogenic anomaly of tooth shape that represents the extreme of continuous variation progressing from an enlarged cingulum (trace talon) through a small accessory cusp (semitalon) to a talon cusp.[1] Small talon cusps are usually asymptomatic and need no treatment. Large talon cusps may cause clinical problems including occlusal interference, displacement of the affected tooth, irritation of the tongue during speech and mastication, carious lesion in the developmental grooves that

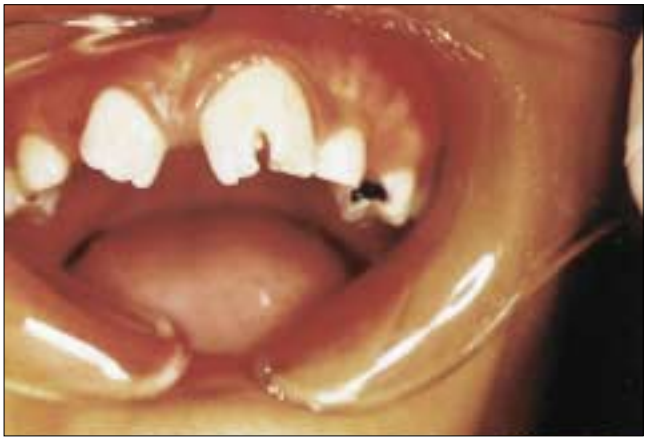

Figure 1: *Frontal view on initial presentation showing large, bifid and malpositioned geminated maxillary left central incisor associated with wide midline diastema.*

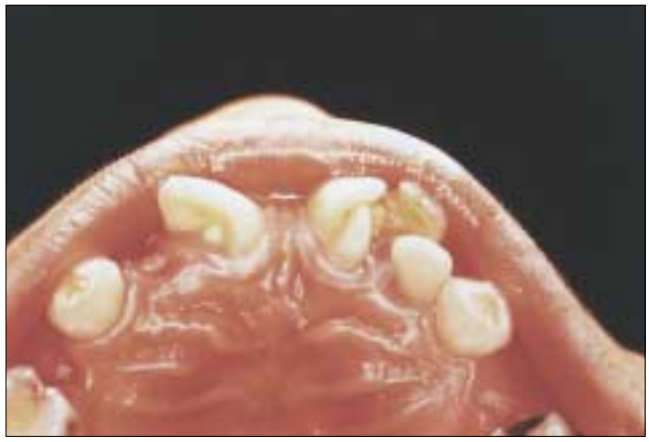

Figure 2: *Palatal view demonstrating talon cusp on the geminated left central incisor projecting from the cingulum and extending almost to the incisal edge. The right central incisor exhibits exaggerated cingulum.*

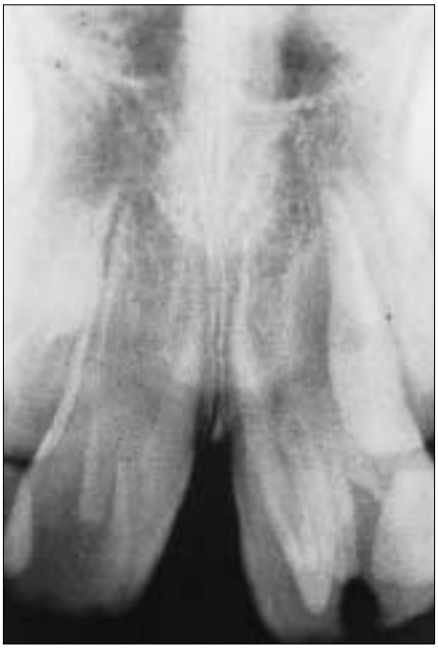

Figure 3: *Periapical radiograph showing talon cusp outlined by two white lines representing the enamel, with pulp horn extending to the middle of the cusp. Note the enlarged pulp chamber and the single root of the affected tooth.*

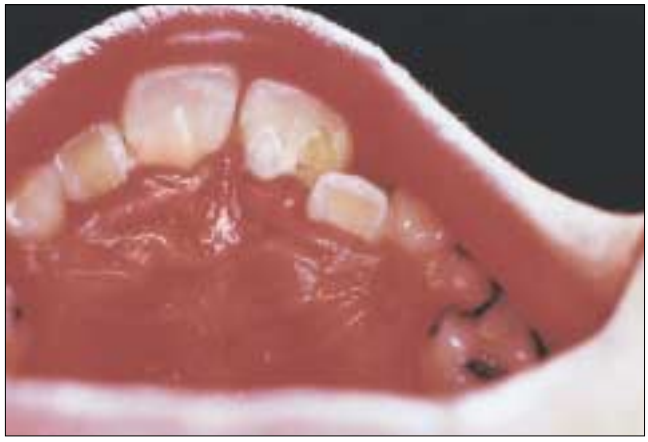

Figure 4: *The talon cusp was reduced almost completely after 3 visits at 6- to 8-week intervals without exposing the pulp.*

delineate the cusp, pulpal necrosis, periapical pathosis, attrition of the opposing tooth and periodontal problems due to excessive occlusal forces.[1-5] Talon cusps also present diagnostic and treatment difficulties. On unerupted tooth, the anomalous cusp can radiographically be mistaken for a supernumerary tooth or compound odontomas, leading to unnecessary surgical intervention. This diagnostic problem is especially significant because approximately 90% of all supernumeraries occur in the maxilla and half of these in the incisor region.[19]

Gemination is a partial cleavage of a single tooth germ resulting in 2 partially or totally separated crowns with enlarged pulp chamber and one root. With gemination, a normal number of teeth are maintained. The anomalous tooth has a large bifid crown and is usually found as an isolated trait, not associated with syndromes. Irrespective of their origin, dental gemination anomalies often give rise to a number of clinical problems, particularly if the anterior teeth are involved. In our patient, the anomaly caused tooth malalignment, spacing problems, arch asymmetry, unacceptable appearance, periodontal involvement and impeded the eruption of the adjacent tooth.

The treatment of talon cusp involves careful clinical judgment and review of whether the cusp contains or is devoid of a pulp horn. Earlier reports, based on radiographic examination, stated that removal of the cusp would inevitably lead to pulp exposure that would require endodontic treatment.[2] However, radiographic tracing of

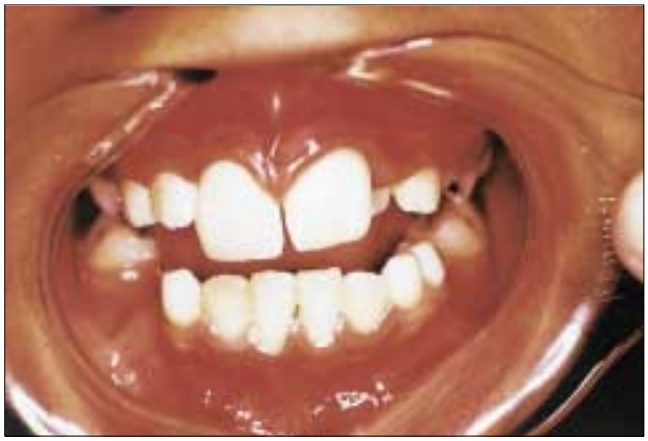

Figure 5: *Appearance of the maxillary incisors after conservative and orthodontic treatment.*

the pulpal configuration inside the talon cusp has inherent difficulties because the cusp is superimposed over the affected tooth crown. Similarly, histological examination of extracted talon teeth failed to show the presence of a pulp horn in the talon cusp.[20-22] Pitts and Hall removed 3 mm of the anomalous cusp in one visit, without pulp exposure.[23] Several times, we have reduced 1.0 mm to 1.5 mm of talon cusp in one appointment without exposing the pulp.[1,5] However, this does not imply that all talon cusps are devoid of pulp horn.

Reports describing the treatment of gemination are scant and inconclusive because of the rarity of the condition, particularly in the permanent dentition. In the present case, initial thought was given to reducing tooth structure mesiodistally and placing a composite restoration to give the tooth a normal appearance and to prevent plaque accumulation in the notch of the crown. In addition, orthodontic consideration was required.

Geminated-taloned teeth cause a variety of clinical problems that call for early diagnosis. Care should be taken to recognize developmental, periodontal and orthodontic effects. The patient's expectation and degree of compliance must also be accurately assessed when determining suitable management. ◆

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