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## Talon cusp affecting permanent maxillary lateral incisors in 2 family members

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The term *talon cusp* refers to a relatively rare dental anomaly in which an accessory cusplike structure projects from the cingulum area or cement-enamel junction. The condition can occur in either maxillary or mandibular anterior teeth in both the primary and permanent dentitions. This article reports 2 cases of talon cusp affecting consanguineous first cousins: a case of bilateral talon cusps on the permanent maxillary lateral incisors of a 16-year-old girl, and a case of talon cusp on the maxillary permanent lateral incisor of an 11-year-old boy. The talon cusps caused clinical problems that were related to caries or occlusal interferences. The presence of the dental anomaly in 2 members of the same family suggests that genetic inheritance may be a causative (related) factor. Examination of relatives could facilitate early diagnosis of the talon cusp and aid in preventing carious and occlusal problems. (**Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999;88:90-2**)

The anomalous talon cusp is composed of normal enamel and dentin with varying extensions of pulp tissue. Mitchell<sup>1</sup> first described this malformation as a "process of hornlike shape, curving from the base downward to the cutting edge" on the lingual surface of an upper central incisor of a female patient. Shulze<sup>2</sup> referred to the anomaly as a very high accessory cusp, which may connect with the incisal edge to produce a T-form or, if more cervical, a Y-shaped crown contour. Mellor and Ripa<sup>3</sup> named the accessory cusp a *talon cusp* because of its resemblance in shape to an eagle's talon. Talon cusp affects both sexes and commonly is unilateral, but one fifth of the cases are bilateral. The anomaly varies widely in shape, size, structure, location, and site of origin. The tip of the cusp may stand away from the crown or be in close approximation to the lingual surface.<sup>4</sup> Talon cusp has been also described as affecting the labial surface of the tooth.<sup>5,6</sup>

Talon cusp occurs more frequently in the permanent than in the primary dentition. A review of the literature shows that the talon cusp was exhibited in the permanent dentition in 75% of cases and in the primary dentition in 25% of cases.<sup>4</sup> Talon cusp shows a predilection for the maxilla over the mandible.<sup>4</sup> The maxillary lateral incisors are the teeth most frequently involved (67%); they are followed by the central incisors (24%) and the canines (9%).<sup>4,7,8</sup>

Hattab et al<sup>4</sup> classified the anomaly into 3 types on the basis of the degree of cusp formation and extension: type I (*talon*), an additional cusp that projects from the palatal surface of an anterior tooth and

extends at least one half the distance from the cement-enamel junction to the incisal edge; type 2 (*semitalon*), an additional cusp 1 millimeter or more in length but extending less than one half the distance from the cement-enamel junction to the incisal edge; type 3 (*trace talon*), manifesting enlarged and prominent cingula and their variations.

This article reports the presence of the 3 types of talon cusp on the palatal surfaces of maxillary permanent lateral incisors in 2 members of the same family. One patient showed bilateral talon cusps. In both cases, the talons caused clinical problems related to caries or to occlusal interferences.

### CASE REPORTS

#### Case 1

A healthy 16-year-old girl was seen for a routine dental examination. Her medical and dental history was uneventful. Both maxillary lateral incisors exhibited small prominent cusps on their palatal surfaces (Fig 1). The cusp on the right lateral incisor was teatlike, extending less than one third the distance from the cement-enamel junction to the incisal edge. The pits in the mesial and the distal of the small cusp were darkly stained and packed with dental plaque. A carious lesion was detected clinically in the distal pit. The accessory cusp on the left lateral incisor, conical in shape, projected from the cement-enamel junction and extended less than halfway to the incisal edge. The cusp measured 3.5 mm in length (incisocervically), 4.5 mm in width (mesiodistally), and approximately 2.5 mm in thickness (labiolingually). A small bridge of enamel connected the semitalon to the palatal surface. The developmental grooves on the distal and mesial sides of the semitalon were darkly stained but noncarious. Both affected teeth were responsive to electrical pulp testing.

The cusps neither irritated the tongue during speech and mastication nor interfered with occlusion. Other dental variations included (1) accentuated marginal ridges on the right central incisor and (2) large cusps of Carabelli on the maxillary first molars.

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Received for publication Dec. 29, 1997; returned for revision July 28, 1998; accepted for publication Sept. 22, 1998.

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1079-2104/99/\$8.00 + 0 7/15/95469



Fig 1. Case 1. Small prominent cusps on palatal surfaces of both lateral incisors (mirror photograph).



Fig 2. Case 2. Facial view shows prominence of talon cusp.

### Case 2

An 11-year-old boy, first cousin to the patient in case 1, appeared for treatment of a periodontal problem. Clinical examination disclosed a prominent cusplike structure on the palatal surface of the maxillary right lateral incisor (Fig 2). The talon cusp was pyramidal in shape and extended from the cement-enamel junction halfway to the incisal edge. It was attached to the palatal surface and extended perpendicular to the mesiodistal surface of the crown. The cusp tip was pointed and sharp and coincided with the midline of the long axis of the tooth, forming a Y-shaped crown outline. The cusp measured 4.5 mm in length (incisocervically), 4.0 mm in width (mesiodistally), and 3.5 mm in thickness (labiolingually). Noncarious developmental grooves were observed laterally (Fig 3). Otherwise, the tooth appeared normal and responded to electrical pulp testing.

The taloned tooth, the contralateral incisor, and both permanent maxillary canines were not fully erupted. However, because of the reduced overbite, the talon cusp interfered with the occlusion; wear facets were present on the cusp and the incisal edge of the opposing tooth. The talon cusp did not irritate the tongue during speech and mastication, and the patient had no symptoms. The palatally positioned right maxillary central incisor also contacted edge-to-edge with the mandibular right central incisor. No other dental variations were detected.

### DISCUSSION

Talon cusp originates during the morphodifferentiation stage of tooth development, but the cause of the condition remains unknown. In most reported cases, the talon cusp is isolated, not an integral part of some disorder; nevertheless, the anomaly has been reported in patients with Sturge-Weber syndrome (encephalotrigeminal angiomas),<sup>8</sup> Mohr syndrome (oral-facial-digital syndrome, type II),<sup>9</sup> Ellis-van Creveld syndrome,<sup>10</sup> and Rubinstein-Taybi syndrome.<sup>11</sup> Neither of the cases reported here was associated with any known abnormal systemic developmental syndrome.

Control of the complex processes of dental develop-



Fig 3. Case 2. Incisal view of lateral incisor shown in Fig 2. Cusp tip is pointed and sharp and coincides with midline. Noncarious developmental grooves are observed at lateral sides of cusp.

ment appears to be multifactorial; in other words, it is primarily polygenetic, with some environmental influence. Talon cusp is usually associated with other dental variations—bifid cingula, dens invaginatus, exaggerated cusps of Carabelli, and, in particular, shovel-shaped maxillary incisors.<sup>4</sup> The last of these is a polygenic inheritable trait characterized by accentuated marginal ridges that surround a deep lingual fossa.<sup>12</sup>

As is the case with talon cusp, the maxillary lateral incisors are the teeth most commonly affected with shoveling and dens invaginatus.<sup>13,14</sup> The susceptibility of the lateral incisors to abnormalities could partly be related to compression of the tooth germ of the lateral incisor by the adjacent central incisor and canine, which develop approximately 7 months earlier than the lateral incisor. Increased localized external pressure on a tooth germ during the morphodifferentiation stage may result in either outfolding of the dental lamina (in

the case of talon cusp) and shoveling or infolding of the dental lamina, as in dens invaginatus.<sup>13</sup>

In the cases reported here, the associated dental and occlusal anomalies were as follows: accentuated marginal ridges on the central incisor, large cusps of Carabelli on the maxillary first molars, incomplete eruption of maxillary canine, palatal displacement of the right central incisor, and reduced overbite.

In our 2 cases, the anomaly affected first cousins. Family histories of cases reported previously also revealed that talon cusp sometimes affected patients who had consanguineous parents.<sup>4</sup> Moreover, there is literature supporting the notion that the character of talon cusp is hereditary: the anomaly has been described as affecting 2 siblings<sup>10,15</sup> and 2 sets of female twins.<sup>16</sup> The prevalence of talon cusp is high in some racial groups.<sup>17-20</sup>

The family involvement and the association of the talon cusp with other dental abnormalities suggest that genetics may be a major causative factor. However, sporadic occurrences of this abnormality probably are induced by trauma or other localized insults affecting the tooth germ. In morphologic character, cases reported as talon cusp are very different. Some cusps are quite sharp and spiked, whereas others are teatlike and have rounded and smooth tips.<sup>4</sup> Talon cusps may be markedly enlarged or exaggerated cingula on the maxillary incisors.<sup>9</sup> Other investigators have described them as hornlike, conical, or pyramidal.<sup>4,8</sup> Davis and Brook<sup>21</sup> stated that talon cusp may represent the extreme of a continuous variation, progressing from a normal cingulum to an enlarged cingulum, then to a small accessory cusp, and then to a cusp with a talon shape.

According to the classification by Hattab et al,<sup>4</sup> the talon cusps described here were designated as follows:

- the anomalous teatlike cusp on the left lateral incisor in case 1, representing a variation of enlarged or prominent cingula and their variations—a type 3 or “trace talon”
- the accessory cusp on the right lateral incisor in case 1, conical in shape—a type 2 or “semitalon”
- the talon cusp in case 2, pyramidal in shape and extending from the cement-enamel junction halfway to the incisal edge forming a Y-shaped crown—a “talon cusp.”<sup>8</sup>

Early diagnosis and management of talon cusp is important for the sake of preventing occlusal interference, compromised esthetics, carious developmental grooves, periodontal problems due to excessive occlusal forces, and irritation of the tongue during speech and mastication. Here we have reported 2 cases of talon cusp that caused clinical problems related to

either occlusal interference or caries. The presence of the dental anomaly in 2 members of the same family suggests that the examination of relatives could facilitate early diagnosis and aid in preventing carious and occlusal problems.

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