

# An Uncommon Dental Anomaly: Talon Cusp

<sup>1</sup>Usha Hegde, <sup>2</sup>Paras Mull J, <sup>3</sup>Gazala Danish, <sup>4</sup>Syed Nabeel

<sup>1</sup>Consultant, Oral and Maxillofacial Pathologist, Smile Maker Clinics, Mysore, Karnataka, India

<sup>2</sup>Consultant, Endodontist, Smile Maker Clinics, Mysore, Karnataka, India

<sup>3</sup>Consultant, Oral and Maxillofacial Diagnostician and Radiologist, Smile Maker Clinics, Mysore, Karnataka, India

<sup>4</sup>Director, Smile Maker Clinics, Mysore, Karnataka, India

**Correspondence:** Usha Hegde, Consultant, Oral and Maxillofacial Pathologist, Smile Maker Clinics, #187, 2nd Stage, MG Road 2nd Main, Udayagiri, Mysore-570 019, Karnataka, India, Phone: +919844453444, 9845106626, e-mail: gundheg@yahoo.com dr.syednabeel@gmail.com

## Abstract

Talon cusp is an uncommon dental anomaly presenting as an accessory cusp. It is seen in both deciduous and permanent dentition and on lingual and facial surfaces of anterior teeth. It can occur unilaterally or bilaterally. The incidence of occurrence is more in maxillary teeth. It is usually asymptomatic but can pose functional and esthetic problems. This article presents the review of talon cusp in relation to its definition, etiopathogenesis, prevalence, clinical and histological findings, clinical implications, radiographic findings, classification and management aspects.

**Keywords:** Talon cusp, accessory cusp, dental anomaly.

## INTRODUCTION

Talon cusp was described as an anomalous hyperplasia of the cingulum of maxillary or mandibular permanent incisors resulting in the formation of a supernumerary cusp resembling an eagle's talon.<sup>1,2</sup> However, there are reports of talon cusp occurring on the facial surfaces, in deciduous incisors and also in canines. Therefore, the talon cusp can now be defined as an uncommon dental anomaly manifesting as an accessory cusp-like structure, projecting from the lingual or facial surface of anterior teeth of either dentition.<sup>3</sup> It was first described by WH Mitchell in 1892, and was named as "Talon cusp" by Mellor and Ripa in 1970.<sup>4</sup>

The etiopathogenesis is multifactorial, and is thought to be polygenetic with some environmental influences.<sup>5</sup> Clinically it can pose esthetic and functional problems to the patient.<sup>6-9</sup> Histologically, it is composed of normal enamel and dentin and it may or may not contain pulpal tissue.<sup>7</sup> Radiographically the talon cusp is usually superimposed over the tooth on which it occurs.<sup>2</sup> Hattab et al<sup>6</sup> have classified talon cusp as true talon, semitalon and trace talon, based on the degree of formation and extension. The treatment objective of talon cusp should include preserving pulpal vitality, meeting esthetic and occlusal requirements, establishing caries prevention or eradication in developmental grooves and eliminating tongue irritation.<sup>7</sup>

## REVIEW OF LITERATURE

Talon cusp was described as an anomalous hyperplasia of the cingulum of maxillary or mandibular permanent incisors resulting in the formation of a supernumerary cusp resembling an eagle's talon.<sup>1,2</sup> However, there are reports of talon cusp occurring on the facial surfaces, in deciduous incisors and also on canines. Therefore, the talon cusp is now defined as an uncommon dental anomaly manifesting as an accessory cusp-like structure, projecting from the lingual or facial surface of anterior teeth, on either dentition.<sup>3</sup>

Talon cusp was first recognized by WH Mitchell in 1892, who described an accessory cusp on the lingual surface of an upper central incisor of a woman as "a process of hornlike shape curving from the base downwards to the cutting edge". In 1970 Mellor and Ripa named the accessory cusps as talon cusp because of its resemblance in shape to an eagle's talon.<sup>4,6</sup>

Mader<sup>10</sup> has suggested that the term talon cusp be reserved only for those anomalous cusps that prominently project from the lingual surface of a succedaneous tooth, that are morphologically well-delineated and extend at least half the distance from the cemento-enamel junction to the incisal edge. Talon cusp has even been shown in archaeological specimens. Halcrow SE and Tayles N<sup>11</sup> have reported a case of talon cusp in a deciduous lateral incisor

of an infant from prehistoric Southeast Asia which possibly represents the earliest case of talon cusp recorded. Another case of talon cusp in a primary lateral incisor in an ancient skeleton of a medieval child has been published by Mays S.<sup>12</sup> This report shows that talon cusp existed in British populations, more than 600 years before the first written description.

As in the case of any other abnormality of tooth shape and size, talon cusp occurs early in odontogenesis during the morphodifferentiation stage. It may occur as a result of outward folding of the inner enamel epithelial cells (precursors of ameloblasts) and a transient focal hyperplasia of the mesenchymal dental papilla (precursors of odontoblasts).<sup>8</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 about 7 months earlier than the lateral incisor. Increased localized external pressure on a tooth germ during morphodifferentiation stage may result in either outfolding of the dental lamina as in the case of talon cusp and shoveling or infolding of the lamina as in dens invaginatus.<sup>6</sup> Sicher and Bhaskar<sup>13</sup> have suggested that disturbances during morphodifferentiation such as altered endocrine function might affect the shape and size of a tooth without impairing the function of the ameloblasts and odontoblasts. Another possible cause of the condition that is discussed is hyperproductivity of the anterior segment of the dental lamina. Cases of talon cusp associated with gemination, hyperdontia or mesiodens support this hypothesis.<sup>14</sup> Bilateral distribution of talon cusp in some cases, its association with other dental abnormalities, talon cusp occurring in family members, twins, offsprings from consanguineous marriages and in some genetic syndromes support genetic etiology of the condition.<sup>5,8,14,15</sup> However, sporadic occurrences of this abnormality probably are induced by trauma or other localized insults affecting the tooth germ. Therefore control of the complex processes of dental development appears to be multifactorial. It is primarily polygenetic with some environmental influence.<sup>5</sup>

Prevalence of talon cusp is low affecting less than 1% to approximately 8% of the population.<sup>16,17</sup> It has been reported in different ethnic groups. It has been reported in Caucasians, in African Americans and in Mongoloid population.<sup>18</sup>

Sedano et al<sup>16</sup> in 1989 assessed the prevalence of talon cusp in Mexican children to be 0.06%. Chawla et al<sup>17</sup> in

1983 reported that 7.7% of the North Indian children exhibited a talon cusp. Talon cusp is also present in Eskimos, American Indians and Asians.<sup>18,19</sup>

It has predilection for permanent dentition than deciduous dentition as 75% of the cases have been reported involving permanent dentition. More cases are reported in males than in females (Males 64%, females 36%). It shows a striking predilection for the maxilla over mandible, with 92% of cases manifesting in the maxillary anterior teeth.<sup>6</sup> All reported talon cusps in primary teeth affected the maxillary central incisors, while in the permanent dentition maxillary lateral incisor was most frequently involved (67%), followed by central incisors (24%) and canines (9%).<sup>6</sup> A review of English language dental literature published between 1970 and 1995 showed most information to be based on case reports. Almost 92% of the taloned teeth were found in the maxilla with 55% on lateral incisor and 33% on central incisors.<sup>19</sup>

Histologically talon cusp is composed of normal enamel and dentin, pulpal tissue may be present or absent. It has been suggested that large talon cusps, especially those that are separated or stand away from the tooth crown are more likely to contain pulp tissue.<sup>6,8</sup>

Talon cusp is not an entirely innocuous defect. It may give rise to complications. It may present a number of problems both to the patient and the clinician. They include compromised esthetics, occlusal interferences, displacement of affected tooth, carious developmental grooves, pulpal necrosis and periapical pathosis, periodontal problems due to excessive occlusal forces, advanced attrition leading to pulp exposure, irritation of the tongue during speech and mastication, interference with tongue space, problems in breastfeeding, accidental cusp fracture and temporomandibular joint pain. In some cases occlusal interference may not be observed, if the patient presents with bimaxillary protrusion and reduced overbite.<sup>6-9</sup> Unerupted taloned tooth may be mistaken radiographically for a supernumerary tooth or compound odontomas, leading to unnecessary surgical intervention.<sup>4,18</sup>

Radiographic image of talon cusp is usually superimposed with that of the tooth on which it occurs. Its outline is smooth and a layer of normal appearing enamel is usually distinguishable, but pulp horn if present may not be demonstrated.<sup>2</sup>

Typically the cusp looks like a V-shaped structure superimposed over the normal image of the crown.<sup>6</sup> The

cusp is usually radiographically apparent before eruption and may suggest the presence of a supernumerary tooth. This possibility can be ruled out by another radiograph made with an altered horizontal angle of projection (tube shift technique).<sup>2</sup> In many previous publications that have reported the appearance of talon cusp containing a pulpal extension the diagnosis appears to be based on radiographic evaluation in which the talon cusps were superimposed over the main pulpal chamber.<sup>6,8,18</sup> According to Mader and Kellogg<sup>20</sup> this is a near impossible way to distinguish the existence of a pulpal extension.

There are no definite diagnostic criteria for talon cusp which include all its forms and variants. Gorlin and Goldman<sup>21</sup> have defined talon cusp as a very high accessory cusp which may connect with the incisal edge to produce a T or V form or if lower in level a Y-shaped crown contour. Davis and Brook<sup>22</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 talon cusp. Hattab et al<sup>6</sup> have suggested a classification system based on the degree of formation and extension:

*Type I (Talon/True talon):* A morphologically well delineated additional cusp that prominently projects from the palatal surface of a primary or permanent anterior tooth and extends at least half the distance from the cemento-enamel junction to the incisal edge.

*Type II (Semitalon):* An additional cusp of a millimeter or more but extending less than half the distance from the cemento-enamel junction to the incisal edge. It may blend with the palatal surface or stand away from the rest of the crown.

*Type III (Trace talon):* Enlarged or prominent cingula and their variations i.e., conical, bifid or tubercle like.

Radiographically it may appear typically as a V-shaped radiopaque structure, as for true talon and semitalon, or tubercle-like, originating from the cervical third of the root.<sup>6</sup>

There are reports on unusual presentation of talon cusps. Cases of facial talon cusp, facial and palatal talon cusps, talon cusp co-occurring with dens invaginatus, gemination, supernumerary teeth and fused tooth, have been reported.<sup>3,6,18,22-26</sup> Talon cusps has been found to occur as an isolated dental anomaly or in association with other dental anomalies. Talon cusp has been reported in literature occurring with other dental anomalies like bifid cingulum, tubercle-like cingulum, accentuated marginal ridges,

agenesis of teeth, shovel shaped incisors, dens invaginatus, accessory cusps of premolars, prominent cusps of carabelli,<sup>6</sup> microdont<sup>8</sup>, cingulum hypertrophy.<sup>24</sup>

Talon cusp has also been reported in patients with Sturge-Weber syndrome, Mohr syndrome, Ellis-van creveld syndrome, Rubinstein-Taybi syndrome and incontinentia pigmenti achromians.<sup>6,19,23</sup>

Treatment may differ depending on each case. Small talon cusps are usually asymptomatic, necessitating no treatment. However, large, prominent and separated talon cusps require definitive treatment with respect to esthetics, occlusion, periodontal and carious problems.<sup>6</sup> It is desirable to evaluate and treat the talon cusp soon after eruption to avoid further clinical problems.<sup>3</sup> The developmental grooves at the lateral aspects of the anomalous cusps are susceptible to caries. Deep non-carious grooves and fissures should be cleaned of debris and plaque and prophylactically sealed with fissure sealant. If grooves are carious, the lesion should be eradicated and the cavity filled with glass ionomer restorative material.<sup>6</sup> Where esthetic appearance and occlusal interference are not a problem the concavity between the cusp and tooth surface can be obturated with composite resin.<sup>8</sup> In case of premature contact and occlusal interference, the anomalous cusp should be reduced. If the treatment needs the removal of a substantial portion of the cusp, then reduction should be gradual and on consecutive visits at 6-8 weeks intervals to allow deposition of reparative dentin and pulp obliteration within the extension. Following each grinding procedure, the tooth surface should be treated with a desensitizing agent, preferably fluoride varnish.<sup>6,23</sup> This approach appears to be adequate in some cases but cannot be applied predictably in all situations, particularly if the occlusal interference is severe. In these cases, a complete reduction of the cusp is required. This is probably the most common approach, but it requires some form of pulp therapy, like root canal treatment or vital pulp therapy techniques such as partial pulpotomy.<sup>23,27</sup> Partial pulpotomy has a high success rate comparable to root canal treatment, although size of exposure is not related to the success rates of partial pulpotomy.<sup>23</sup> In cases with immature tooth, complete reduction of the cusp followed by calcium hydroxide pulpotomy can be done.<sup>8</sup>

## CONCLUSION

In conclusion talon cusp is an accessory cusp like structure occurring on lingual or facial surface of deciduous or

permanent dentition occurring unilaterally or bilaterally in either of the jaws. Although talon cusp may present as an innocuous and asymptomatic structure and noted only on routine dental examination, it may pose functional and/or esthetic problems. Early detection of talon cusp could prevent the complications associated with it. It is important to identify a talon cusp, since it may be useful in recognizing syndromes associated with it.

## REFERENCES

1. Shafer WG, Hine MK, Levy BM. *A Textbook of Oral Pathology*. 4th ed. Philadelphia: WB Saunders 1983;40-41.
2. Goaz PW, White SC. *Oral Radiology*. Missouri: CV Mosby Company; 1987;447.
3. Siraci E, Cem Gungor H, Taner B, Cehreli ZC. Buccal and palatal talon cusps with pulp extensions on a supernumerary primary tooth. *Dentomaxillofac Radiol* 2006;35(6):469-72.
4. Mellor JK, Ripa LW. Talon cusp: A clinically significant anomaly. *Oral Surg* 1970;29:225-28.
5. Segura JJ, Jimenez-Rubio A. Talon cusp affecting permanent maxillary lateral incisors in 2 family members. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999;88(1):90-92.
6. Hattab FN, Yassin OM, al-Nimri KS. Talon cusp in permanent dentition associated with other dental anomalies: Review of literature and reports of seven cases. *ASDC J Dent Child* 1996;63(5):368-76.
7. Gungor HC, Altay N, Kaymaz FF. Pulpal tissue in bilateral talon cusps of primary central incisors: Report of a case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;89(2):231-35.
8. Hattab FN, Yassin OM, al-Nimri KS. Talon cusp—clinical significance and management: Case reports. *Quintessence Int* 1995;26(2):115-20.
9. Soares AB, de Araujo JJ, de Sousa SM, Veronezi MC. Bilateral talon cusp: Case report. *Quintessence Int* 2001;32(4):283-86.
10. Mader CL. Talon cusp. *J Am Dent Assoc* 1981;103(2):244-46.
11. Halcrow SE, Tayles N. Talon cusp in a deciduous lateral incisor from prehistoric Southeast Asia. *International Journal of Osteoarchaeology*. Published online—19 Nov 2008. <http://www3.interscience.wiley.com/journal/121519917/abstract>. Accessed on 24th/feb/2010.
12. Mays S. Talon cusp in a primary lateral incisor from a medieval child. *Int J Paediatr Dent*. 2005;15(1):67-72.
13. Sicher S, Bhaskar SN. *Orban's oral histology and embryology*. (7th ed). St Louis: CV Mosby Company 1972;17-37.
14. Dumancic J, Kaic Z, Tolj M, Jankovic B. Talon Cusp: A Literature Review and Case Report. *Acta Stomatol Croat* 2006;40(2):169-74.
15. Segura-Egea JJ, Jimenez-Rubio A, Rios-Santos JV, Velasco-Ortega E. Dens evaginatus of anterior teeth (talon cusp): report of five cases. *Quintessence Int* 2003;34(4):272-77.
16. Sedano HO, Freyre IC, Garza de la Garza ML, et al. Clinical orodontal abnormalities in Mexican children. *Oral Surg Oral Med Oral Pathol* 1989;68(3):300-11.
17. Chawla HS, Tewari A, Gopalakrishnan NS. Talon cusp-A prevalence study. *J Indian Soc Pedod Prev Dent* 1983;1(1):28-34.
18. Al-Omari MA, Hattab FN, Darwazeh AM, Dummer PM. Clinical problems associated with unusual cases of talon cusp. *Int Endod J* 1999;32(3):183-90.
19. Dankner E, Harari D, Rotstein I. Dens evaginatus of anterior teeth. Literature review and radiographic survey of 15,000 teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1996;81(4):472-75.
20. Mader CL, Kellogg SL. Primary talon cusp. *ASDC J Dent Child* 1985;52(3):223-26.
21. Gorlin RJ, Goldman HM (Eds). *Thoma's oral pathology*, 6th edn. CV Mosby Co., St Louis, 1970;96.
22. de Sousa SM, Tavano SM, Bramante CM. Unusual case of bilateral talon cusp associated with dens invaginatus. *Int Endod J* 1999;32(6):494-98.
23. Abbott PV. Labial and palatal "talon cusps" on the same tooth: A case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998;85(6):726-30.
24. Gunduz K, Acikgoz A. An unusual case of talon cusp on a geminated tooth. *Braz Dent J* 2006;17(4):343-46.
25. Siraci E, Gungor HC, Cehreli ZC. Dens invaginatus and talon cusp co-occurring in a mandibular central incisor: A case report. *ASDC J Dent Child (Chic)* 2008;75(2):177-88.
26. Vardhan TH, Shanmugam S. Dens evaginatus and dens invaginatus in all maxillary incisors: Report of a case. *Quintessence Int*, 2010;41(2):105-07.
27. Dinesh Rao B, Hegde S. A talon cusp on fused teeth associated with hypodontia: Report of a unique case. *Eur J Dent* 2010;4(1):75-80.