ISSN - 2394-7721

American Journal of Oral Medicine and Radiology

Journal homepage: www.mcmed.us/journal/ajomr

# SPOTLIGHT ON TALONS CUSP: AN OVERVIEW

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**Article Info**

*Received 23/01/2015*
*Revised 16/02/2015*
*Accepted 19/03/2015*

**Key words:-** Talon cusp, accessory cusp, dental anomaly.

**ABSTRACT**

Developmental anomalies affecting number, size, shape, structure, and location of teeth are varied. One such rare anomaly affecting the shape of anterior teeth is talon cusp. The term talon cusp refers to a relatively rare dental anomaly in which an accessory cusp like structure projects from the cingulum area or cementoenamel junction. The condition can occur in either maxillary or mandibular anterior teeth in both the primary and permanent dentitions. This review provides comprehensive knowledge of the clinical entity as well as problems associated with it, thereby preventing or minimizing complications.

## INTRODUCTION

Talon cusp is an unusual cuspal projection from an anterior tooth with normal enamel and dentin containing varying degrees of pulp tissue. Other terminologies used to denote this anomaly are dens evaginatus, interstitial cusp, tuberculated tooth, evaginated odontoma, supernumerary cusp, hyperplastic cingulum, cusped cingulum, odontoma of axial core type, supernumerary lingual tubercle, occlusal anomalous tubercle, occlusal enamel pearl, of which dens evaginatus is used for both anterior and posterior teeth. Talon cusp was first recorded by Mitchell in 1892. She described this accessory cusp on the lingual surface of a maxillary central incisor as "a process of a horn-like shape curving from the base downward to the cutting edge" in a female patient. Mellor and Ripa named this condition "talon cusp" because of its resemblance to an eagle's talon [1]. Shulze defined talon cusp as a very high accessory cusp, which may connect with the incisal edge to produce a "T" form or a "Y"-shaped crown contour. Mader in 1981 and Davis in 1986 redefined this entity as "a morphologically well-delineated cusp that projects from the lingual surface of the primary or permanent anterior tooth and extends at least half the distance from the cementoenamel junction to the incisal edge " [2]. The prevalence of talon cusp varies with race, age, and the criteria used to define this abnormality. Prevalence of 0.17% in the United States, 0.06% in Mexico, 5.2% in Malaysia, and 7.7% in the north Indian population has been reported [3,4]. A review of the literature suggests that 75% of the cases are in the permanent dentition and 25% in the primary dentition [5]. This anomaly has a greater predilection in the maxilla (with more than 90% of the cases reported) than in the mandible (only 10 % of the cases). In the permanent dentition, 55% of the cases involved maxillary lateral incisors, 33% involved central incisors, and 4% involved canines. Predominantly 65% of the talon cusps occur in males [6,7].

Tsutsumi et al, Jowharji et al, and McNamara et al [8] reported cases with facial talon cusp. Abbott and Dunn reported cases of both labial and palatal talon cusps on the same maxillary permanent incisor [9]. Salama and Nadkarni have reported talon cusp on a supernumerary tooth [10]. The first report of a talon cusp in the primary dentition was in 1977 by Henderson. Since then, numerous cases have been reported in the literature, some of which were bilateral talon cusps. Chin-Ying et al reported 2 more cases of bilateral talon cusp in primary central incisors. Recently, Tsai and Chang and Tiku et al have reported cases of talon cusp in primary incisors [11].

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**Figure I. Depicting Type I talon cusp on palatal aspect in maxillary left lateral incisor Courtesy: Outpatient department of Oral Medicine, Diagnosis & Radiogy, Institute of Dental Education & Advance Studies**

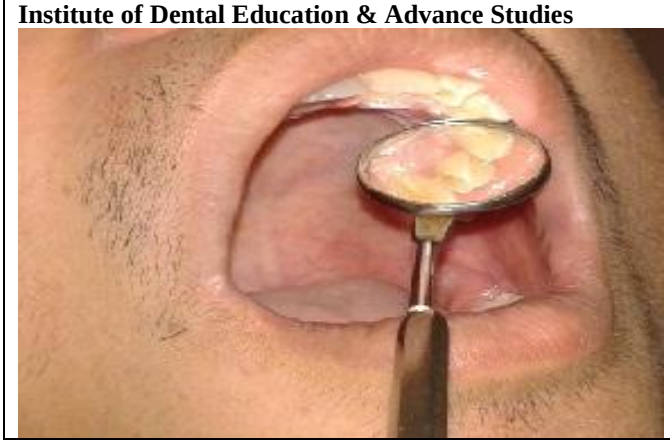
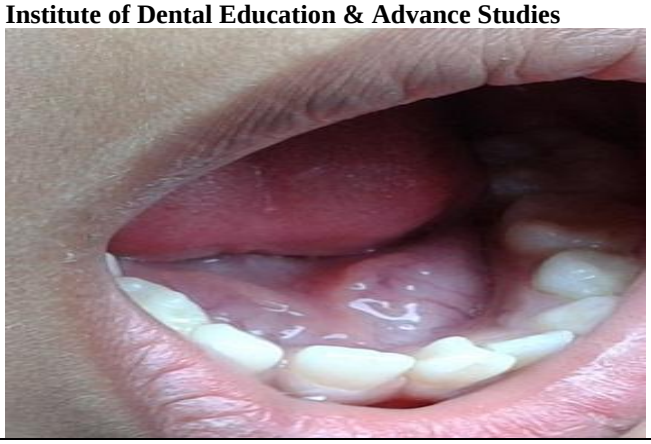


**Figure II. Depicting Type I talons cusp on lingual aspect in mandibular left central incisor Courtesy: Outpatient department of Oral Medicine, Diagnosis & Radiogy, Institute of Dental Education & Advance Studies**



## DISCUSSION

Talon cusp or dens evaginatus is a rare anomaly with multifactorial etiology including both genetic and environmental factors. The exact etiology of this condition is unknown. Hattab et al suggested that the anomaly might occur because of out folding of the enamel organ and a transient focal hyperplasia of mesenchymal dental papilla. Hyperactivity of the dental lamina has been considered as an etiological factor. Sicher and Bhasker suggested that disturbances during the morphodifferentiation stage (eg, altered endocrine function) might affect the tooth's size and shape. The susceptibility of maxillary lateral incisors may be due to the compression of the tooth germ in the morpho differentiation stage from the adjacent central incisor and canine, which develops 7 months earlier than the lateral incisor. This compression can result in out folding of the dental lamina. This cannot be the cause of talon cusps in primary teeth, as all the incisors start developing at the same time and the canine develops after the lateral incisors mature. In addition, most of the talon cusps of the primary teeth involve maxillary central incisors. It is generally believed that the cause could be due to a combination of genetic and environmental factors [12]. Hattab et al classified this anomaly into 3 types on the basis of the degree of cusp formation and extension. Type I (talon) has an additional cusp that projects from the palatal surface of an anterior tooth and extend at least one half the distance from the cemento enamel junction to the incisal edge. Type II (semi talon) has an additional cusp 1 mm or more in length but extending less than one half the distances from the cemento enamel junction to the incisal edge. Type III (trace talon) manifest enlarged and prominent cingula and their variation [13]. Furthermore it is important to remember that talon cusp is occasionally combined with other systemic and dental anomalies. The talon cusp can occur as an isolated finding or in association with other dental anomalies such as bifid cingula, peg-shaped lateral incisor, agenesis or impacted canines, mesiodens, supernumerary teeth, complex odontomes, megadont, dens evaginatus of posterior teeth, shovel-shaped incisors, dens invaginatus, cross-bite, retrognathic mandible, hypodontia and exaggerated Carabelli cusp. Although this anomalous cusp has not been reported as an integral part of any specific syndrome, it appears to be more prevalent in patients with Rubinstein-Taybi syndrome, Mohr syndrome (oral-facial-digital syndrome type II), Sturge-Weber syndrome (encephalotrigeminal angiomatosis), or incontinentia pigmenti achromians & Ellis–van Creveld syndrome. Cytogenetic or molecular investigations may be useful. Clinically talon cusp differs from dens evaginatus of posterior teeth. The anterior teeth undergo shearing forces that may result in displacement of the occluding teeth and significantly less fracture of the anomalous cusps [14]. Lin et al [15] reported pulp exposure and pulp necrosis in 14.1% to 40.2% of examined cases due to attrition or trauma. Developmental grooves and fissures at the junction of the talon cusp and the tooth surfaces are more susceptible to caries, depending on the shape, size and location of these structural defects, associated periodontal involvement might occur.

Gungor et al [16] histologically detected presence of pulp horn in accessory cusp which increases the chances of pulpal insult and death. Teeth with talon cusp may undergo pulpal necrosis if early diagnosis is not done and management is neglected or inappropriate to the case.

### Complications

The complications of the talon cusp are diagnostic, functional, aesthetic, and pathological. It includes compromised aesthetics, periodontal problems, or irritation of the soft tissues during speech or mastication. Functional complications include occlusal interference, trauma to the lip and tongue, speech problems, and displacement of teeth. The deep grooves which join the cusp to the tooth may also act as stagnation areas for plaque and debris, become carious, and cause subsequent

periapical pathology. Occlusal interference can damage the periodontium, cause infra-occlusion of the opposing tooth and also temporo-mandibular joint pain. Severe attrition or fracture of the enamel surface can cause exposure of the dentine-pulp complex and consequently, pulp necrosis [17].

**Management**

The presence of a talon cusp is not always an indication for dental treatment unless it is associated with clinical problems. The treatment of talon cusp may be conservative or radical, depending on the accessory cusp like shape, location, size, and tooth affected. Early diagnosis of talon cusp is important and in most cases definitive treatment is needed. Deep noncarious developmental grooves on the lateral aspects of the anomalous cusps should be cleaned with slurry of pumice, acid etched and sealed with fissure sealant. If the grooves are carious, the lesion should be removed and the cavity should be restored with glass ionomer restorative material. In case of premature contact and occlusal interference, the talon cusp should be reduced gradually on consecutive visits over 6-8 week intervals to allow time for deposition of reparative dentin for pulpal protection [18]. After each grinding procedure, the tooth surface should be covered with a desensitising agent such as application of topical fluoride such as Duraphat® or acidulated phosphate fluoride (APF) gel to reduce sensitivity and stimulate reparative dentine formation for pulp protection. Under certain conditions, less conservative methods can be used such as complete reduction of the cusp followed by calcium hydroxide pulpotomy for an immature tooth or root-canal therapy. Most talon cusps contain extensions of pulp tissue similar to pulp horns. Since the talon cusp and its pulpal extension are superimposed over the main pulp chamber, however, the extent of the extra pulp horn becomes difficult to distinguish. It may also become necessary sometimes, to fully reduce the cusp, extirpate the pulp, and carry out root canal therapy. Orthodontic correction may become necessary when there is tooth displacement or malalignment of affected or opposing teeth. Small talon cusps are asymptomatic and need no treatment.[19]

**CONCLUSION**

Talon cusp is a not an innocuous defect, as it may provide a substantial challenge during diagnosis and treatment planning to clinician. Early diagnosis may minimize local problems such as caries, periodontal disease and malocclusion.

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