

Bilateral talon cusp in permanent maxillary lateral incisors: A case report, clinico-pathological review and proposal of an integrated classification

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Abstract

Talon cusp (TC) is an uncommon developmental anomaly resulting from the invagination of inner enamel epithelium cells. It is primarily seen in people of Asian descent. Maxillary lateral incisors are the teeth most commonly affected by this dental malformation. Early detection and management are pertinent to prevent complications that may be associated with the TC. We describe the successful diagnosis and management of a rare case of nonsyndromic bilateral TC in permanent maxillary lateral incisors with conservative therapy. Further, while discussing the case, we present a brief clinicopathological review on TC and also propose an “integrated classification of talon cusp (ICTC) to describe the morphological aspects as well as indicate the severity and difficulty in the management of cases. An early specific diagnosis along with multidisciplinary treatment approach is recommended for TC, especially to avoid pulpal complications in teeth.

Keywords: Lateral incisors, maxillary, nonsyndromic, talon cusp, tooth anomaly

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INTRODUCTION

Talon cusp (TC) is an anomalous structure composed of normal enamel, dentine and the horn of pulp tissue, which projects lingually from the cingulum areas of a maxillary or mandibular permanent incisor.^[1] TC was first described in 1887 and first documented in 1892 by Windell and Mitchell, respectively.^[2,3] Due to TC's resemblance with an eagle's talon, Mellor and Ripa (1979) named this anomaly “Talons Cusp.”^[3,4] TC's morphological trait has been described by various other terms as well, which include dens evaginatus, evaginated odontome, supernumerary lingual

tubercle, occlusal enamel pearl, odontomas of axial core type, occlusal tubercle, cusped cingulum accessory cusp and hyperplastic cingulum.^[3,5]

To avoid pulpal complications in permanent teeth, TC must be diagnosed early and managed.^[5] The aim of this paper is to describe a case of nonsyndromic bilateral TC in permanent maxillary lateral incisors with conservative therapy. Further, while discussing the case, we present a brief review on TC and also propose a comprehensive and integrated classification of talon cusp (ICTC).

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CASE REPORT

An 8-year-old girl reported to the department of pedodontics and preventive dentistry with the chief complaint of occlusal interference.

History and general examination

The family and medical history of the child regarding malocclusion was insignificant. The parents of the child gave no history of trauma in the anterior region during dentition development, dental anomalies and consanguineous marriage. A thorough general examination was carried out to rule out the presence of any associated syndrome or disease.

Intraoral examination

Intraoral examination showed the presence of mixed dentition with flush terminal plane relationship of upper and lower second deciduous molars. Both the permanent maxillary lateral incisors exhibited a peculiar well-delineated extra cusp-like protuberance on the palatal surface. This additional elevated structure was seen to be projecting from the cingulum surface and extending toward the incisal edge completely, giving it a characteristic “true talon”^[6] appearance [Figures 1 and 2]. The affected teeth were responding to electric pulp testing. The projecting cusps were responsible for causing occlusal interference.

Malocclusion traits

The facio-lingual (FL) width of the TC is greater than the average lateral incisor, hence the teeth show



Figure 1: An intraoral view showing the presence of bilateral talon's cusp type 1 in the right and left maxillary lateral incisors

malalignment with proclination. The space between permanent central incisor and deciduous lateral incisor is insufficient to accommodate the mesio-distal (MD) width of the lateral incisor and the MD of permanent canine (on radiographs), and may cause a Bolton's discrepancy.

A periapical radiograph of the upper anterior region revealed the presence of a V-shaped radiopaque structure superimposed on the affected crown of the right and left lateral incisors, and the point of the “V” was facing toward the incisal edge [Figure 3]. Orthopantomogram radiograph confirmed the presence of TC in the permanent maxillary right and left lateral incisors [Figure 4].

Based on the above clinical and radiological features, a definitive diagnosis of a nonsyndromic TC was established.

Management and follow-up

TC was reduced to eliminate occlusal interferences; this was done by periodic grinding of the palatal surfaces of the TC [Figure 5]. Subsequently, in the following visits, fluoride varnish application was done. Reduction of the TC was done gradually in five consecutive appointments with 8-week intervals. A conservative approach was done to prevent caries and correct malocclusion.

The patient kept under observation was recalled for follow-up visits on 1, 3, 6 and 12 months, and was found to be asymptomatic.

Prognosis and future plan

The reduction in FL width of Talon's cusp, as done in the current case, is a primary prerequisite for future



Figure 2: Dental cast of the child clearly showing the presence of bilateral talon's cusp on the palatal surface of the maxillary lateral incisors



Figure 3: An intraoral periapical radiograph



Figure 4: Orthopantomogram X-ray showing bilateral talon's cusp in the permanent maxillary lateral incisors



Figure 5: Postoperative image after the reduction of talon's cusp on the palatal surface of the right and left maxillary lateral incisors

orthodontic retraction to avoid occlusal interference and to be accommodated in the alveolar segment width pertaining to the lateral incisor. For the management of TC in permanent dentition, the MD width of the lateral incisor and canine also might need inter-proximal reduction for tooth alignment in the maxillary arch using fixed orthodontic treatment. The prognosis is good with occlusal and functional correction of teeth in majority of cases after reduction of occlusal interference and orthodontic alignment of teeth.

DISCUSSION

Demography and prevalence

The overall occurrence of TC is estimated to be between 0.06% and 7.7% of the population.^[7] However, the prevalence of TC has been found to be 0.58% (16 of 2740) in Indian,^[3] 0.55% (52 of 9377) in Jordanian,^[8] 5.2% (28 of 536) in Malaysian^[9] and 0.34% (49 of 14400) in Turkish^[10] populations. TC is more commonly present in males than females and is found more frequently in permanent than deciduous teeth. TC is more common in maxillary teeth and the maxillary lateral incisor is commonly affected in permanent dentition, whereas central incisor in the primary dentition.^[7,11,12]

Although literature evidence favors prevalence of TC in males than females, the current case report shows the presence of TC in the lateral incisors of an 8-year-old female, which is documented as the most commonly associated tooth with TC.

The current case had bilateral involvement of permanent maxillary lateral incisors. Very few cases of bilateral TC have been reported globally involving various teeth, which include permanent maxillary central incisors (Brazil^[13] and Turkey^[14]), permanent maxillary lateral incisors (USA,^[15] India^[5] and Turkey^[16]), permanent maxillary canines (India^[17]) and deciduous maxillary central incisors (Saudi Arabia^[18]).

Aetiopathogenesis

Though the etiology of TC has not been established, the higher predilection for males as mentioned earlier is an indication of the sex-linked basis of the etiology of TC in the primary dentition.^[5] TC is considered to be multifactorial and polygenetic in etiology which includes nutritional deficiency, developmental disturbances, systemic diseases and trauma. Irrespective of etiology, the pathology of TC initiates at the morpho-differentiation stage of a developing tooth.^[19] TC has been suggested to arise from the out folding of inner enamel epithelial (future ameloblasts) and gradual focal hyperplasia of dental papilla (future odontoblasts).^[20]

Variants of talon

TC has been classified by many authors based on the extension of cusp, involved tooth, the shape of TC and the surface involved.^[7] Hattab *et al.*, 1996, classified TC into the following three types: (1) true talon, i.e., Type I (TI); (2) semi talon, i.e., Type II (TII) and trace talon, i.e., Type III (TIII) based on the degree of cusp formation and extension.^[6] Mallineni *et al.*, 2014, based on the surface

involved classified TC into facial (F), lingual/palatal (L/P) and facial and lingual/palatal (FL/P).^[7]

Proposal for integrated classification of talon cusp

After careful appraisal of literature, we found that many classifications of TC exist, but none of them suffice or describe the anomaly type completely. Hence, though this platform, we propose comprehensive ICTC, which will comprise the following four components:

1. Teeth involved in Federation Dentaire International system, followed by
2. Unilateral (U) or bilateral (BL), followed by
3. Degree of cusp formation ranging from TI to TIII,^[6] followed by
4. Surface involved ranging from F to FL/P.^[7]

For example, in the present case:

TC = 12, BL, TI, P and

TC = 22, BL, TI, P

Establishing diagnosis

Although periapical radiography has been commonly used for diagnosis, it is not accurate and conclusive as it is a two-dimensional imaging system.^[21] Cone-beam computed tomography (CBCT) can help determine the best treatment as it provides three-dimensional dental imaging and allows for visualizing any pulpal extension into the dens evaginatus.^[22,23] In the present case, intraoral periapical radiograph and panoramic radiography were used to establish a definitive diagnosis as the parents of the child did not give consent for CBCT imaging.

Clinical features and management protocol

TC is not a component of any specific syndrome^[24] but can be associated with a number of syndromes such as Rubinstein–Taybi, Mohr, Sturge–Weber and Ellis van Creveld.^[3,25] However, the patient in the present case had none of these mentioned syndromes.

TC is not just an esthetic problem but has been found to interfere with occlusion, cause irritation to the soft-tissue structures of the mouth and make teeth susceptible to accidental fractures^[16] or dental caries.^[2,16] Majority of TC cases require definitive treatment.^[5] Grooves if present, even if devoid of caries, should be prophylactically sealed with a fissure sealant to prevent caries, and if there is occlusal interference or premature contact, it should be reduced.^[5,6,26] A careful clinical judgment may be required to assess whether the TC has the presence or absence of a pulp horn. Selective grinding can be done repeatedly over

a long period for reducing cusp height. This encourages the deposition of reactionary dentine on the pulpal surface of dentine. If a substantial portion of the cusp is to be removed, consecutive visits with 6-week to 8-week intervals should be planned to allow for the deposition of reparative dentine.^[5,6] We reduced the TC occlusally bilaterally by periodical grinding to allow deposition of reactionary dentine necessary for pulp protection. Application of fluoride varnish was done in subsequent visits to reduce the sensitivity of the involved teeth.

CONCLUSION

BL involvement of the TC is an uncommon developmental anomaly. Early diagnosis and clinical management together with periodic follow-up are of paramount importance to allow teeth to follow their natural course of development. The use of CBCT should be encouraged by the clinicians in specific cases as it helps determine the best treatment plan. Pediatric dentists, orthodontists, oral pathologists, oral radiology and allied subjects can work hand in hand in the early diagnosis and management of occlusal interference and malocclusion due to the presence of this anomalous cusp morphology and further prevent the potential complications associated with it.

Through this article, we have proposed an integrated comprehensive classification of TC to provide a complete description of the anomaly. It may be useful in indexing the variation in the morphology of TC as well as in the difficulty in the management of TC. A specific diagnosis and multidisciplinary treatment approach is recommended if the TC is associated with other dental abnormalities.

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Conflicts of interest

There are no conflicts of interest.

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