

# Minimally invasive management of a labial talon cusp: Clinical review and case report

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## ABSTRACT

This case report presents the management of a rare occurrence of a labial talon cusp on a permanent maxillary lateral incisor. The buccal projection was reduced with a minimally invasive approach, with the aim of avoiding pulpal exposure during tooth preparation and thereby maintaining the vitality of the pulp. A direct resin veneer was placed to mask the remaining projection and to address the aesthetic concerns of the patient.

## Keywords

Labial Talon cusp, buccal projection, maxillary lateral incisor.

## INTRODUCTION

A Talon cusp (TC) is a relatively uncommon dental anomaly characterised by the presence of an additional cusp-like structure on the palatal or, more rarely, labial surface of the anterior teeth, extending from the cemento-enamel junction (CEJ).

Talon cusp development is thought to occur during morpho-differentiation when an outward folding of the inner enamel epithelium results in the subsequent development of an additional cusp-like structure comprised of normal enamel and dentine, with or without pulpal tissue.<sup>1,2</sup>

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- Nicoline Potgieter:** Clinical case, write up, editing and submission - 50%
- C Davidson:** Diagnosis confirmation and write up - 30%
- I Middleton:** Write-up - 20%

## ACRONYMS

<b>CEJ:</b>	Cemento-Enamel Junction
<b>TC:</b>	Talon Cusp

Genetic, environmental and endocrine disturbances have all been suggested as possible aetiological factors in the development of a TC.<sup>3-8</sup>

Hattab et al.<sup>2</sup> classified TCs into three categories according to the extent of their projection from the CEJ towards the incisal edge. Later Mayes<sup>9</sup> categorised TCs into three stages:

**Stage 1:** the slightest form, exhibiting a slightly raised triangle on the palatal surface, extending the length of the crown, but not reaching the CEJ or the incisal edge.

**Stage 2:** moderate form with a slightly raised triangle on the palatal surface extending the length of the crown and reaches the CEJ or the incisal edge.

**Stage 3:** the most severe form, with a free form cusp extending from the CEJ to the incisal edge on the palatal surface of the incisor. More recently, Mallineni et al.<sup>10</sup> classified TCs according to the surface on which they were found.

TCs affect both the primary and permanent dentition with the latter involved more frequently.<sup>11</sup> Males seem to present with TCs more often than females and the permanent tooth most affected is the maxillary lateral incisor followed by the maxillary central incisors and canines.<sup>12,13</sup>

Facial or labial TCs are reported in the literature to be a rare finding, as are also reports of TCs on mandibular anterior teeth.<sup>14-16</sup>

The presence of a TC is clinically significant as the grooves surrounding the anomaly exacerbate plaque accumulation making the tooth particularly susceptible to caries.

The extension of pulpal tissue places the tooth at further risk for pulpal involvement which may require endodontic treatment. Furthermore, in instances where the TC is lingually/palatally positioned, it could interfere with occlusion.

## CASE REPORT

A healthy, 13-year-old girl attended together with her mother, complaining of the aesthetic appearance of her upper right lateral incisor. According to the history, no other clinical symptoms were present, except for discomfort on the upper lip adjacent to the projection. The patient was already receiving orthodontic treatment.

Upon clinical examination, a prominent labial projection and palatal indent was noted on the right lateral incisor. The mesio-distal width of the tooth was about 1mm wider than the corresponding lateral incisor. The projection extended from the cervical margin and was covered by enamel but separated from the rest of the buccal surface by deep grooves (Fig. 1).

It was also noted that there was an indentation in the upper lip corresponding to the position of the TC and that this was sensitive to palpation. Periodontal probing depths were 2-3mm around the tooth. No other clinical pathological findings were noted. A clinical diagnosis of a labial TC was made.

Radiographically, a well-defined cusp-like structure was observed, centred over the central portion of the crown of the tooth. The outline of the projection was smooth with a prominent layer of enamel covering the dentine. Root development of the tooth was almost complete and corresponded to the development of the contra-lateral lateral incisor (Fig. 2a).

A segmental Cone Beam Computed Tomography (CBCT) scan was done to evaluate the presence and extent of pulpal tissue extending into the talon cusp projection (Fig. 2b).

The option of no intervention was discussed with the patient and parent as the mere presence of a TC is not an indication for treatment. However, the mother and child insisted on treatment because of the aesthetics being important to the teenage girl. They were informed of the possible pulp exposure and subsequent pulp therapy treatment should this occur.

After informed consent was signed by the parent, anaesthesia was achieved by infiltration of local anaesthetic alongside the tooth. A rubber dam was placed and the cusp was gradually reduced up to the planned depth, without pulp exposure (Fig. 3a).

However, during preparation, it was noted that the TC extended subgingivally. The rubber dam was removed and gingival retraction cord packed was packed to displace the gingival tissue and ensure moisture control. The preparation was extended to approximately 2 mm sub-gingival into the sulcus to ensure removal of the projection in order to obtain a more aesthetic result (Fig. 3b).

The exposed enamel was etched with 34% phosphoric acid (Scotchbond Universal Etchant, 3M ESPE, St. Paul, USA) for 20 seconds and the exposed dentine

for 10 seconds. A bonding agent (Adper Scotchbond 1XT adhesive, 3M ESPE, St. Paul, USA) was applied and light-cured according to manufacturer's instructions. A combination of shade A2 and A1 Resin Nano Composite Filtek Supreme XTE (3M ESPE, St Paul, USA) was incrementally packed to complete the direct resin veneer and modified to resemble the morphology of a lateral incisor. Resin composite was also added to the palatal surface to seal a large indentation.

After final light curing, the restoration was subsequently finished and polished. The direct resin veneer was finished and polished using a yellow stripe, flame-shaped diamond finishing bur (Dentsply Sirona, Ballaigues, Switzerland; ISO 806 314 249 504 012) and the Enhance Polishing System (Dentsply Sirona, Milford, USA).

The patient and parent were very happy with the immediate post-operative result (Fig. 3c). The patient is receiving orthodontic treatment for the management of space problems as well as correcting rotations and positions of permanent teeth.

On the 18 month follow-up the 12 is asymptomatic and tests vital. Aesthetically the result is still pleasing (Fig. 4a). The peri-apical radiograph confirmed apex closure (Fig. 4b). The patient is currently undergoing orthodontic treatment for correction of angulations and space discrepancies as well as the impacted canine.

## DISCUSSION

Tooth development, involving epithelial-ectomesenchymal interaction, is a highly regulated process. Disturbances occurring late in the bell stage can affect the shape and size of a tooth without necessarily influencing the cells responsible for secreting the coronal dental tissues.<sup>17</sup>

In this case report the enamel, dentine and dental pulp within the cusp-like buccal projection all appeared normal. There was however, a small discrepancy in the larger size of the tooth compared with the contralateral lateral incisor.

Although TCs can occur in the primary and permanent dentitions, more than three quarters of TCs are found in the permanent dentition. The maxillary central incisor is not as commonly affected (33%) as the maxillary lateral incisor, which occurs in 55% of cases.

The mandibular incisors are seldom affected (6%), and the mandibular canine is the least affected (4%).<sup>18</sup> The TC is found on the lingual palatal surfaces in most cases, thus the cusp found on the labial surface is a rare finding.<sup>19</sup>

The TC is not associated with a specific syndrome but TCs have been found in patients diagnosed with Rubinstein-Taybi syndrome, Sturge-Weber syndrome, Ellis-van Creveld syndrome and Mohr syndrome.<sup>18</sup> Another interesting finding was that identical talons cusps have been found in a pair of twins so a genetic influence is most likely.<sup>18</sup>



**Figure 1.** Clinical pre-operative photographs of (A) the labial view; and (B) the incisal view, note the indentation in the upper lip.



**Figure 2.** (A) Peri-apical radiograph of the right lateral incisor; (B) sagittal slice of the CBCT scan showing the pulp tissue extending into the TC.



**Figure 3.** Clinical photographs of the (A) rubberdam isolation before preparation; (B) gingival retraction cord in place after removal of the buccal projection; (C) immediate post-operative result.



**Figure 4.** 18 Month follow-up: (A) clinical picture; (B) peri-apical radiograph showing apical closure (orthodontic appliance also in place).

Different approaches to the management of TCs have been reported, including: step-wise periodic reduction, partial removal or full removal of cusps.<sup>20-23</sup>

Step-wise or periodic reduction of the cusp has been advised as it may stimulate tertiary dentine formation and possible pulp obliteration within the cusp.<sup>20-22</sup> The application of fluoride or desensitizing agents to cover exposed dentine have been advocated to limit sensitivity.<sup>20,21</sup> The stepwise approach however is time consuming, unpredictable and will not be suitable for all cases.

With complete removal of TC, pulp exposures are often inevitable and consequently vital pulp therapy or root canal treatment is required. Maintaining pulp vitality is advantageous for long term prognosis, especially if root formation is not yet completed.<sup>24,25</sup>

Vital pulp therapy procedures include direct pulp capping and partial or complete pulpotomy. The prognosis of vital pulp therapy is considered good if the pulp is healthy, which is the case with most TCs.<sup>26-28</sup>

Proper isolation, the correct use of biocompatible materials and effective coronal seal also influence the prognosis of the treatment.<sup>29,30</sup> Kumar et al.<sup>23</sup> described a successful case where a 5 mm pulpotomy was performed using sodium hypochlorite as haemostatic agent and Mineral Trioxide Aggregate as pulp capping material. The tooth remained vital and asymptomatic with no signs of pathology at the four-year follow up.

Abbott<sup>19</sup> described a case with a double TC, positioned both labially and palatally which interfered with occlusion. Taking into consideration that two large exposures were expected, vital pulp therapy was considered unavoidable and treatment proceeded with the full removal of both cusps and root canal treatment.

Factors including the size and location of the TCs impact on aesthetics, and interference with function should be considered when deciding on different treat-

ment options. In addition to the cusp, the presence and extension of pulp tissue into cusp, pulp status and root completion of the tooth in question should also be considered.

Procedures exposing the pulp may pose the risk of iatrogenic damage, inflammation or infection of the pulp. In addition to the factors mentioned above, any type of pulp therapy (vital or non-vital) in the anterior region remains an aesthetic challenge as most endodontic materials cause discolouration of the crown.<sup>31</sup> Therefore it is advantageous if pulp exposures can be limited or at best avoided.

## CONCLUSION

In this case report, the management of an uncommon labial TC is described. Conservative minimally invasive intervention resulted in successful management, resulting in an improved aesthetic outcome and an overall quality of life for this patient.

## Disclosure

The authors declare no conflicts of interest related to the case reports depicted in this article.

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*Happy  
Rosh Hashanah!*

*To all those who celebrated  
the beginning of the new year  
on the 29th of September, we  
wish you prosperity, happiness  
and good health. May this  
year provide you with all that  
which brings you joy!*