



## A CBCT AIDED PRESENTATION AND MANAGEMENT OF DENS EVAGINATUS (TALONS CUSP) IN PERMANENT CENTRAL INCISOR : A CASE REPORT

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### ABSTRACT

Talons cusp is a rare anomaly with multifactorial etiology including both genetic and environmental factors. It is seen in both primary and permanent dentition, prevailing most commonly in maxillary lateral followed by central incisors. A case of palatally occurring talons cusp with caries in a permanent maxillary central incisor is reported along with its diagnosis and management protocol.

#### Key words:

Talon cusp, accessory cusp, dens evaginatus, supernumerary cusp management

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### INTRODUCTION

The talon cusp, or dens evaginatus of anterior teeth, is a relatively rare dental developmental anomaly characterized by the presence of an accessory cusp like structure projecting from the cingulum area or cemento-enamel junction; commonly occurring in either maxillary or mandibular anterior teeth in both the primary and permanent dentition. Maxillary teeth (94%) are usually involved, prevailing most commonly in maxillary lateral incisors (55%) followed by maxillary central incisor (33%). Predominantly 65% of the talon cusps occurs in males<sup>2</sup>. Prevalence of talon cusp varies considerably among ethnic groups ranging from 0.06% to 7.7%.<sup>1</sup>

It is a rare anomaly with multifactorial etiology including both genetic and environmental factors. Various theories have been proposed, however most accepted one suggests that talon cusp might occur as a result of an outward folding of inner enamel epithelial cells and a transient focal hyperplasia of mesenchymal dental papilla<sup>3,4</sup>.

The term "talon cusp" was coined by Mellor and Ripa<sup>2</sup> due to its resemblance to an eagle's talon. Since then, this odontogenic anomaly has been given several descriptions, such as, prominent accessory cusp-like structure,<sup>3</sup> exaggerated cingula<sup>4</sup>, additional cusp<sup>5</sup>, cusp-like hyperplasia<sup>6</sup>, accessory cusp<sup>7</sup> and supernumerary cusp.<sup>6</sup>

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 cement enamel junction to the incisal edge.
- Type II (semitalon) -has an additional cusp 1 mm or more in length but extending less than one half the distance from the cement enamel junction to the incisal edge.
- Type III (trace talon-) manifest enlarged and prominent cingula and their variation<sup>4</sup>

Talon cusp may be isolated (non syndromic) or syndromic including Mohr syndrome, Sturge-Weber syndrome, Rubinstein-Taybi syndrome, Bloch-Sulzberger syndrome, and Ellis-van Creveld syndrome.<sup>10</sup>

Large talon cusps may cause clinical problems including occlusal interference, displacement of the affected tooth, irritation of the tongue during the speech and mastication, carious lesion in the developmental groove that delineate the cusp, pulpal necrosis, periapical pathosis, attrition of the opposing tooth and periodontal problems due to excessive occlusal forces.<sup>5</sup>

Management of a tooth with talon cusp varies from selective cuspal grinding to endodontic treatment depending on the extent of pulpal involvement and severity of the case. Proper diagnosis is needed to formulate case-appropriate treatment protocol. The aim of the present article is to report a case of "Talon Cusp Type I" in a permanent maxillary central incisor with carious pulp exposure that required endodontic treatment.

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### Case report

A 12-year-old male child reported to the Department of Pedodontics and Preventive Dentistry with the chief complaint of severe pain in upper left front teeth region. The patient's medical history was noncontributory. A history of broken tooth fragment from the palatal side of the upper left tooth one day ago was recorded. Examination of the oral cavity revealed normal soft tissue and normal development of dentition. The palatal surface of permanent maxillary left central incisor was involved with caries (Fig. 1). Patient had previously visited a dental clinic one week ago where an IOPA and a CBCT was advised.

Previous Intraoral periapical radiograph of this tooth revealed the presence of an additional cusp which was superimposed over the crown of the incisor tooth (Fig. 2) CBCT confirmed pulp horn extending into the talons cusp. (Fig. 3,4) According to clinical and radiographic findings, caries initiating from the grooves around the talon cusp reached the pulp chamber, and irreversible pulpitis was diagnosed. Depending upon the signs and symptoms of the patient, complete removal of the carious talon cusp along with the pulp extirpation and root canal therapy of the maxillary left central incisor was considered necessary.

Local anesthesia containing 1.8 mllidocaine and 1/80000 epinephrine (Daroo-Pakhsh Co., Iran) was injected in the labial sulcus. After removal of caries, access cavity was prepared (fig. 5) from the palatal surface of the tooth. During preparation of the outline form of the access cavity, the talons cusp had to be removed to gain a straight -line access to the canal. Pulp extirpation was done followed by canal irrigation by 0.9% normal saline and sodium hypochlorite 2.5%. Working length was determined with the aid of RVG (fig 6). After proper biomechanical preparation of the canal, obturation was done with Gutta Percha cones (Meta Biomed Co., Korea) and AH26 (Dentsply, USA) as a sealer by lateral condensation technique (Fig 7). The tooth was restored with glass ionomer cement (3 M, ESPE) to its common morphology (Figs 8). The restoration was polished and checked for occlusal interferences.

Patient was scheduled for regular check-up examinations. Upon follow-up examination 1 month after the procedure, no adverse signs or symptoms and no periapical pathology were noted.



Fig 1 Maxillary central incisor with carious talons cusp (palatalview)



Fig 2 Preoperative intraoral periapical radiograph

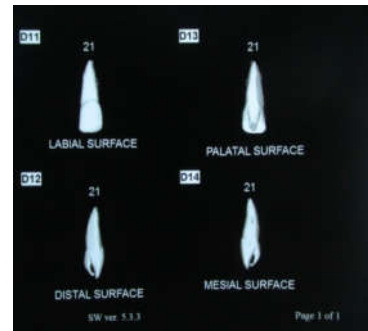


Fig 3 CBCT of tooth with talon cusp before fracture

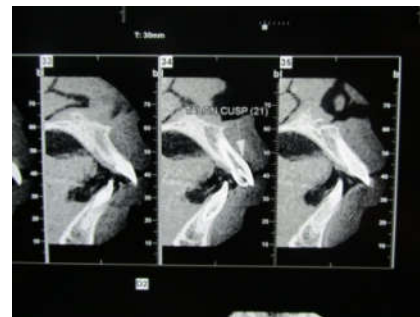


Fig 4 CBCT-sectional view



Fig 5 Removal of talon cusp and access cavity preparation



Fig 6 Working Length determination



**Fig 7** Post obturation RVG



**Fig 8** Post operative clinical view

## DISCUSSION

Although talon cusp usually occurs as an isolated entity, its incidence has also been related to cleft palate syndromes and in association with other anomalies. The case reported here was not associated with any known abnormal systemic developmental syndrome.

The first case was reported by Mitchell in 1892 on the lingual surface of a maxillary central incisor, who described it as 'a process of horn like shape curving from the base downward to the cutting edge'. In the present case, talon cusp extended from cingulum including more than half of the tooth structure to just below the level of incisal edge. The cusp was around 3mm wide (mesiodistally), 6mm (incisocervically) and 3mm thick (labiolingually) extending from cingulum area to the 1 mm short of incisal edge. Using the classification given by Hattab et al.,<sup>7</sup> we grade our case as a Type 1 talon cusp.

Proper diagnosis is the key to determine the treatment protocol. The extent of pulp extension into the cusp is however, difficult to determine in routine intraoral periapical radiographs because of its superimposition over the main pulp chamber.<sup>8</sup> Previous studies have indicated that talon cusps may contain pulp tissue,<sup>7</sup> whereas others found no evidence of pulp extension into the cusp.<sup>9</sup> However, it has been suggested that large talon cusps, especially those that stand away from the tooth crown are more likely to contain pulp tissue.<sup>12,13</sup> This can be overcome with the use of newer imaging techniques such as Cone Beam Computed Tomography that offer higher resolution, greater sharpness and permit volume rendering.<sup>14,15</sup> This mandated a CBCT imaging in the present case to confirm the pulpal extension into the talon.

Management of talon cusp ranges from no-intervention to simple cusp-reduction to cusp-reduction with pulp-therapy. Hattab et al.<sup>10</sup> reported that only the sealing of cracks is

recommended for leaflets that do not have major clinical complications. If there is evidence of dental caries, the tooth must be restored at the earliest. The degree of pulpal involvement and status of the pulp would influence the choice of either conservative pulp procedure such as pulp-capping or pulpotomy, or more radical pulp procedures.

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.<sup>11</sup> In this case, carious exposure leading to pulpal involvement of talon cusp could be because of the deep palatal groove which joined the cusp to the tooth acting as stagnation areas for plaque and debris. Because routine cleaning is difficult, caries, if left untreated may lead to subsequent pulp exposure, periapical pathologies, and periodontal disease can subsequently develop.<sup>16</sup> In obtaining access to the root canal, the access-cavity outline can involve the talon cusp so that the offending cusp is removed during the course of root-canal treatment. A systematic review found that in 56% of case reports analyzed complete reduction was done in a single appointment; periodic reduction in 26% of cases; abstention in 13% and extraction in 5%.<sup>16</sup> Ozcelik and Atila<sup>17</sup> proposed to diminish the talon cusp in a single session; this protocol was termed a "radical treatment" approach and was adopted for the case presented in this paper. Also, since the anomaly is a localized enamel out folding, the subsequent procedure of the root-canal was uneventful and routine in term of canal negotiation, irrigation and obturation. Single visit RCT was performed. Studies have shown that single visit root canal offers several advantages likewise reduced flare rate (Walton and Fouad 1992), good patient acceptance and practice management. 70% of dentists treat necrotic teeth in single visit since it has shown 6.3% higher healing rate than multiple visits.<sup>12</sup>

## CONCLUSION

An early diagnosis is necessary to prevent decay, malocclusion, and aesthetic issues, thus improving the oral health and quality of life of the patient. It should be noted that, in the event of pulp involvement, both treatment protocols involving diminishing the talon cusp should along with endodontic treatment is best suited for the tooth in question, depending on the degree of root development and pulp vitality. It is necessary that dental professionals recognize all types of this anomaly with recent developments in diagnostic imaging techniques so as to formulate a case-appropriate treatment protocol.

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