

Case Report

## Evaginated Odontome with Dens Invaginatus in Maxillary Lateral Incisor – A Rare Presentation

Dr. Anusha Rangare Lakshman<sup>1</sup>, Dr. Chaithra Kalkur<sup>2</sup>, Dr. Renita Iorina Castelino<sup>3</sup>, Dr. Sham Kishor Kanneppady<sup>4</sup>,

<sup>1</sup>Reader and Head of the Department, Department of Oral Medicine and Radiology, Century International Institute of Dental Science and Research Centre, Poinachi, Kasaragod – 671541 Kerala, India

<sup>2</sup>Assistant Professor, Department of Oral Medicine and Radiology, Century International Institute of Dental Science and Research Centre, Poinachi, Kasaragod - 671541 Kerala, India

<sup>3</sup>Assistant Professor, Department of Oral Medicine and Radiology, A.B Shetty Memorial Institute of Dental Sciences, NITTE university, Mangalore

<sup>4</sup>School of Dentistry, International Medical university, Kuala Lumpur, Malaysia

### \*Corresponding Author:

Dr. Anusha Rangare Lakshman

Email: [dr.anusharl@gmail.com](mailto:dr.anusharl@gmail.com)

**Abstract:** 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. This cusp resembles an eagle's talon hence named after it. It usually contains normal enamel, dentin and sometimes extending into the pulp. Dens invaginatus results from an infolding of the outer surface of a tooth. It is the embryological anomaly that results in invagination of an amelodontal structure within the pulp. We are hereby highlighting a rare and unusual case of talon cusp and dens invaginatus occurring concurrently on maxillary lateral incisor.

**Keywords:** Talon cusp, dens evaginatus, dens invaginatus, maxillary incisors.

### INTRODUCTION

Development of tooth is a complex process. Any aberration in the various morphologic stages of tooth development can result in unique manifestations. Talon cusp (dens evaginatus of anterior tooth) is a well-delineated additional cusp that is located on the surface of an anterior tooth and extends at least half the distance from the cemento-enamel junction to the incisal edge [1]. In 1892 this unusual dental anomaly was first described by Mitchell which was thereafter named a Talon cusp by Mellor and Ripa due to its resemblance to an eagle's talon [2, 3]. The exact etiology is unknown. But it is thought to occur during morphodifferentiation stage as a result of outward folding of inner enamel epithelial cells (precursors of ameloblasts) and transient focal hyperplasia of mesenchymal dental papilla (precursors of odontoblasts) or combination of genetic and environmental factors (multifactorial) [4].

The incidence of dens evaginatus varies from 1% to 8% [5]. Three fourths of all reported cases are located in the permanent dentition. The cusps predominantly occur on permanent maxillary lateral (55%) or central (33%) incisors and less frequently on

mandibular incisors (6%) and maxillary canine (4%) [5].

Dens invaginatus is a rare malformation of teeth, showing a broad spectrum of morphological variations [6]. The affected teeth radiographically show an infolding of enamel and dentine which may extend deep into the pulp cavity and into the root and sometimes even reach the root apex. It was first described by Ploquet in 1794 [7]. The teeth most affected are maxillary lateral incisors and occurs in 43% of all cases [7]. But only a few countable cases have been reported about the concurrent occurrence of dens evaginatus and dens invaginatus in single tooth till date. This article is highlighting a rare presentation of occurrence of talon cusp and dens invaginatus in left maxillary lateral incisor in a 23-year-old male patient.

### CASE REPORT

A 23-year-old male patient reported to the Department of Oral Medicine and Radiology with the complaint of deposits on the teeth. No other associated symptoms. Medical, family and dental histories were non-contributory. On intra oral examination, mild calculus and class I dental caries noticed in relation to

right mandibular first molar. Well-defined unilateral accessory anomalous inverted “U”- shaped cusp noticed on the lingual surface of the left maxillary permanent lateral incisor. It was extending from the cementoenamel junction (CEJ) to 5 mm short of the incisal edge, perpendicular to the mesiodistal plane of the tooth, measuring approximately 3 mm in length from base to the tip, 2 mm in width and projecting 0.5 mm away from the crown lingually [Figure 1]. Periapical radiograph revealed the talon cusp as “U”-shaped radiopaque structure on the left maxillary lateral incisors superimposing on the crown and radiopaque enamel invagination noticed extending 2mm below the cement enamel junction (CEJ) superimposing over the pulp canal [Figure 2]. The electric pulp vitality test was negative. As the patient was asymptomatic and the tooth was vital, no treatment was advised and was kept under periodic check-up. He was referred for oral prophylaxis and restoration of the decayed tooth for further treatment.



**Fig-1: Well-defined unilateral inverted “U”- shaped talons cusp on the lingual surface of the left maxillary lateral incisor**



**Fig-2: Periapical radiograph revealed the talon cusp as “U”- shaped radiopaque structure on the left maxillary lateral incisors superimposing on the crown and radiopaque enamel invagination noticed extending 2mm below the CEJ superimposing over the pulp canal**

## DISCUSSION

Morphological variations in dental structures involving either the crown or root have often been reported in the literature. However, instances of multiple anomalies affecting one tooth have been relatively rare. Awareness of such anomalies adds to our existing knowledge of the complex process of normal and abnormal morphogenesis [8].

Dens invaginatus is due to anomalous tooth development during morphodifferentiation. It results from the invagination of the enamel during the soft tissue stage of development before the hard tissue mineralizes [9]. Invaginations may originate in the coronal part of the tooth, or within the root [10]. Various terminologies have been used to describe this condition. According to Sutalo *et al.*, in 1897 Busch first suggested the use of ‘dens in dente’ which implies the radiographic appearance of a tooth within a tooth. However, Hunter suggested the term ‘dilated composite odontome’ which infers an abnormal dilatation of the dental papilla whilst Colby recommended the use of ‘gestant anomaly’. Of the various terms, dens invaginatus would appear to be the most appropriate as it reflects the infolding of the outer portion (enamel) into the inner portion (dentine) with the formation of a pocket or dead space [11].

The aetiology of dens invaginatus malformation is controversial and remains unclear. Most authors, consider dens invaginatus as a deep folding of the foramen coecum during tooth development which in some cases even may result in a second apical foramen [7].

Oehlers described dens in dente according to invagination degree in three forms [7, 12]:

- Type 1: an enamel-lined minor form occurs within the crown of the tooth and not extending beyond the cemento-enamel junction;
- Type 2: an enamel-lined form which invades the root as a blind sac and may communicate with the dental pulp;
- Type 3: a severe form which extends through the root and opens in the apical region without communicating with the pulp.

In the case presented here, according to Oehlers classification its type 2 where the invagination was extending 2mm beyond the CEJ and superimposed over the pulp canal. The incidence of dens invaginatus ranges from 0.04% to 10%, affecting either the deciduous or the permanent dentition. Dens invaginatus may be easily overlooked with adverse effects clinically including increased risk of caries, pulp pathosis, and periodontal inflammation [7, 11].

The radiographic examination shows a radiopaque invagination, equal to enamel in density, extending from the cingulum to a varying distance into

the root. Sometimes, associated with periapical radiolucency associated with the affected tooth. The defects may vary in size and shape from a loop-like, pear-shaped or slightly radiolucent structure to severe form resembling a “tooth within a tooth” [9]. In this case, the invagination was looking “loop- like” structure radiographically.

Treatment of dens invaginatus depends on its severity, with preventive fissure sealing recommended for Type I dens invaginatus, restoration or endodontic treatment for the invagination in Type II dens invaginatus, and an endodontic/surgical approach in the case of Type III dens invaginatus. But in the present case, the tooth was vital and no history of any pain was given. So no treatment was advised for the patient.

Talons cusp has been defined as a supernumerary accessory talon shaped cusp projecting from the lingual or facial surface of the crown of a tooth and extending for at least half the distance from the cemento-enamel junction to the incisal edge [13].

The size and shape of this anomaly shows wide variation and hence it has been classified into 3 types by Hattab *et al* [2]:

**Type1:** Talon – refers to a morphologically well-delineated additional cusp that prominently projects from the palatal (or facial) 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 2:** Semi talon – refers to an additional cusp of a millimeter or more 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 3:** Trace talon – an enlarged or prominent cingula and their variations, i.e. conical, bifid or tubercle-like.

However, Mayes [14] in 2007 categorized facial talon cusps into 3 stages, starting from the slightest to most extreme forms. In the present case, the talon cusp was classified as type 2.

The aetiology of talon cusps remains unknown. It has been suggested that the condition has a multifactorial etiology combining both genetic and environmental factors [15]. In this case, family history was non-contributory. Talon cusps originate during the morpho-differentiation stage of tooth development. They may occur as a result of outward folding of inner enamel epithelial cells (precursors of the ameloblasts)

and transient focal hyperplasia of the peripheral cells of the mesenchymal dental papilla (the precursors of the odontoblasts) [16].

Talon cusp is most commonly seen associated with Rubinstein-Tyabi syndrome, Mohr syndrome (oral facial - digital II syndrome), Sturge Weber syndrome (encephalo-trigeminal angiomatosis), incontinentia pigmentia-chromians and Ellis-van Creveld syndrome [17]. In the present case no such association was noticed.

The presence of a talon cusp is not always an indication for dental treatment unless it is associated with problems such as compromised aesthetics, occlusal interference, tooth displacement, caries, periodontal problems or irritation of the soft tissues during speech or mastication [13, 18]. In the case presented here, it was asymptomatic.

Radiographically, it may appear typically as a V-shaped radiopaque structure, as in true talon or semi-talon, or be tubercle-like, as in trace talon, originating from the cervical third of the root superimposed over the normal image of the crown of the tooth. Similar radiographic feature was seen in the present case as U-shaped radiopaque structure involving maxillary lateral incisor. This appearance varies with the shape and size of the cusp, and the angle at which the radiograph is taken [19].

Treatment and the management of talon cusp usually depend on individual presentation, complications and should be as conservative as possible. If small talon cusps are asymptomatic then no need of any treatment [20]. In this case no treatment was done as it was asymptomatic. Simple prophylactic measures such as fissure sealing and composite resin restoration can be done for deep developmental grooves. In case of occlusal interference, reduce the bulk of the cusp gradually and periodically, and application of topical fluoride gel is indicated to reduce sensitivity and to stimulate reparative dentin for pulp protection or outright total reduction of the cusp and calcium hydroxide pulpotomy. 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 neighboring teeth [1,4].

Only a very few case reports of concurrent occurrence of the talons cusp and the dens invaginatus have been reported till date, to our knowledge and we have summarized in the table 1 [8, 21-28] making this report a rare and unique presentation.

**Table 1: Summary of the reported cases of concurrent occurrence of talon cusp and dens invaginatus**

Sl No.	Authors	Year	Affected tooth
1.	Ranganathan Jaya <i>et al.</i> [8]	2013	Permanent maxillary central incisor
2.	Colak H <i>et al.</i> [21]	2014	Permanent maxillary lateral incisor
3.	Anshul Gangwar <i>et al.</i> [22]	2014	Permanent mandibular lateral incisor
4.	Dharmani U <i>et al.</i> [23]	2014	Permanent mandibular lateral incisor
5.	Tiku A <i>et al.</i> [24]	2004	Permanent maxillary lateral incisor
6.	Siraci E <i>et al.</i> [25]	2008	Permanent mandibular central incisor
7.	Marya CM <i>et al.</i> [26]	2011	Permanent mandibular central incisor
8.	Gehlot PM <i>et al.</i> [27]	2012	Permanent maxillary lateral incisor
9.	Kasat VO <i>et al.</i> [28]	2014	Permanent maxillary lateral incisor

## CONCLUSION

To the best of our knowledge, very few cases of invaginated odontome associated with talon cusp in an erupted permanent maxillary incisor have been reported. With the limitation of conventional radiograph it is difficult to assess the multiple anomalies involving single tooth. So it is advisable to use the newer modalities like Cone Beam Computed Tomography which is useful in the interpretation of this complex tooth anomaly in multiple slices along the three dimensions.

## REFERENCES

- Neville, B. W., Damm, D. D., Allen, C. M., & Bouquot, J. E. (2002). Abnormalities of teeth. In: Text book of Oral and Maxillofacial pathology. 2nd ed. Philadelphia: W.B. Saunders, 78-80.
- Hattab, F. N., Yassin, O. M., & Al-Nimri, K. S. (1996). Talon cusp in permanent dentition associated with other dental anomalies: review of literature and reports of seven cases. *ASDC journal of dentistry for children*, 63(5), 368.
- Davis, P. J., & Brook, A. H. (1986). The presentation of talon cusp: diagnosis, clinical features, associations and possible aetiology. *British Dental Journal*, 160(3), 84-88.
- Hattab, F. N., Yassin, O. M., & Al-Nimri, K. S. (1995). Talon cusp--clinical significance and management: case reports. *Quintessence international*, 26(2).
- Dankner, E., Harari, D., & Rotstein, I. (1996). Dens evaginatus of anterior teeth: literature review and radiographic survey of 15,000 teeth. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 81(4), 472-475.
- Das, A., & Sivakumar, K. (2010). A Case of Dens In Dente In Maxillary Lateral Incisor. *Journal of Indian Academy of Dental Specialists*, 1(3), 47-48.
- Hülsmann, M. (1997). Dens invaginatus: aetiology, classification, prevalence, diagnosis, and treatment considerations. *International Endodontic Journal*, 30(2), 79-90.
- Jaya, R., Kumar, M., Sundaresan, R., & Srinivasan, R. (2013). A rare case of dilated invaginated odontome with talon cusp in a permanent maxillary central incisor diagnosed by cone beam computed tomography. *Imaging science in dentistry*, 43(3), 209-213.
- Sousa, S. D., & Bramante, C. M. (1998). Dens invaginatus: treatment choices. *Dental Traumatology*, 14(4), 152-158.
- Beynon, A. D. (1982). Developing dens invaginatus (dens in dente). A quantitative microradiographic study and a reconsideration of the histogenesis of this condition. *British dental journal*, 153(7), 255-260.
- Alani, A., & Bishop, K. (2008). Dens invaginatus. Part 1: classification, prevalence and aetiology. *International endodontic journal*, 41(12), 1123-1136.
- Zengin, A. Z., Sumer, A. P., & Celenk, P. (2009). Double dens invaginatus: report of three cases. *European journal of dentistry*, 3(1), 67.
- Jowharji, N., Noonan, R. G., & Tylka, J. A. (1992). An unusual case of dental anomaly: a "facial" talon cusp. *ASDC journal of dentistry for children*, 59(2), 156.
- Mayes, A. T. (2007). Labial talon cusp: A case study of pre-European-contact American Indians. *The Journal of the American Dental Association*, 138(4), 515-518.
- Ma'an Al-Far, D. D. S. (2008). Four maxillary talon cusps: A case report. *JRMS*, 15(3), 57-60.
- Lorena, S. C. M., Oliveira, D. T., & Odell, E. W. (2003). Multiple dental anomalies in the maxillary incisor region. *Journal of oral science*, 45(1), 47-50.
- Hattab, F. N., & Hazza a, A. M. (2001). An unusual case of talon cusp on geminated tooth. *Journal-Canadian Dental Association*, 67(5), 263-269.
- Richardson, D. S., & Knudson, K. G. (1985). Talon cusp: a preventive approach to treatment. *The Journal of the American Dental Association*, 110(1), 60-62.
- Oredugba, F. A. (2005). Mandibular facial talon cusp: Case report. *BMC Oral Health*, 5(1), 1.
- Oredugba, F. A., & Orenuga, O. O. (1998). Talon Cusp: Clinical significance and management with reference to Aetiology and presentation. *Nigerian Quarterly Journal of Hospital Medicine*, 8(1), 56-59.
- Colak, H., Yilmaz, C., Keklik, H., & Colak, T. (2013). Talon cusps occurring concurrently with

- dens invaginatus on a permanent maxillary lateral incisor: a case report and literature review. *General dentistry*, 62(3), e14-8.
22. Gangwar, A., Singal, D., Giri, K. Y., Agarwal, A., & Keerthi, S. S. (2014). An immature type II dens invaginatus in a mandibular lateral incisor with Talon's cusp: a clinical dilemma to confront. *Case reports in dentistry*, 2014.
23. Dharmani, U., Rajput, A., Chaudhary, S., Talwar, S., & Verma, M. (2013). Type III talon cusp and Type III B dens invaginatus occurring simultaneously in a mandibular lateral incisor. *General dentistry*, 62(5), e16-21.
24. Tiku, A., Nadkarni, U. M., & Damle, S. G. (2004). Management of two unusual cases of dens invaginatus and talon cusp associated with other dental anomalies. *J Indian Soc Pedod Prev Dent*, 22(3), 128-33.
25. Siraci, E., Gungor, H. C., & Cehreli, Z. C. (2008). Dens invaginatus and talon cusp co-occurring in a mandibular central incisor: a case report. *Journal of Dentistry for Children*, 75(2), 177-180.
26. Marya, C. M., Parashar, V., Grover, S., & Dahiya, V. (2010). A rare case of dens evaginatus and dens invaginatus in the same tooth, with a review of treatment options. *General dentistry*, 59(4), e182-4.
27. Gehlot, P. M., Manjunath, V., & Manjunath, M. K. (2012). Concurrent occurrence of developmental anomalies—dens evaginatus and dens invaginatus in maxillary lateral incisor: report of two cases. *Journal of Orofacial Research*, 2(3), 178-81.
28. Kasat, V. O., Singh, M., Saluja, H., & Ladda, R. (2014). Coexistence of two talon cusps and two dens invaginatus in a single tooth with associated radicular cyst—a case report and review of literature. *Journal of clinical and experimental dentistry*, 6(4), e430.