



## DENS EVAGINATUS - A CLINICALLY SIGNIFICANT ANOMALY

## Oral Pathology

**Ngairangbam Sanjeeta\***

Associate Professor, Department of Oral Pathology and Microbiology, Dental College, RIMS, Imphal-795004, Manipur. \*Corresponding Author

**Takhellambam Premlata Devi**

Associate Professor, Department of Conservative Dentistry and Endodontics, Dental College, RIMS, Imphal-795004, Manipur.

## ABSTRACT

Dens evaginatus (DE) is an uncommon developmental anomaly characterized by the presence of an accessory cusp or tubercle most commonly occurring between the buccal and lingual cusp of permanent premolar or molar teeth. The tubercle normally consists of enamel, dentin and pulp tissue. The tubercle carries important clinical significance as its fracture or wear due to malocclusion or trauma may lead to pulpal exposure, infection, and necrosis shortly following tooth eruption. Early detection and management of this condition are important as frequently, the tubercle goes unnoticed and is discovered late when pulpitis and periapical pathology occur. In most cases, DE is discovered due to periapical inflammation in the absence of obvious clinical presentation of caries, trauma, or other pathologies, thus making it a diagnostic challenge. A case of a mandibular premolar tooth with a barely visible worn out tubercle in a 20-year-old female is reported here with a brief review of literature.

## KEYWORDS

Dens Evaginatus, Occlusal Tubercle, Immature Apex, Periapical Abscess

## INTRODUCTION

Dens evaginatus (DE) is an uncommon developmental anomaly characterized by the presence of an accessory cusp or a globule of enamel, abnormal tubercle, or elevation that occurs in the central groove or lingual ridge of the buccal cusp of permanent premolar or molar teeth.<sup>1</sup> It consists of enamel covering a dentinal core that usually contains pulp tissue which may project at various lengths along the dentinal core.<sup>2</sup> The presence of pulp within the cusp-like tubercle has clinical significance which distinguishes it from extra cusps, such as cusp of carabelli.<sup>3</sup>

DE can be seen in both the dentitions but is seen mostly in permanent teeth. Early detection and management of this condition are important because trauma during mastication causes fracture or wear of the tubercle that leads to pulpal exposure, infection, and necrosis of pulp with associated periapical infection.<sup>1</sup> Frequently, it goes unnoticed and is discovered late when pulpitis and periapical pathology ensues.

Dens evaginatus is most common among Asian populations, with a prevalence of 1–6%, more frequently in females than in males, and seldom occurs in Caucasians or Africans.<sup>4</sup> It is usually observed bilaterally with a symmetric distribution. In this paper, a case of dens evaginatus in a 20 year old female who presented with a swelling in the mandibular premolar teeth region is presented with a brief review of literature.

## Case Presentation

A 20 year old female reported with symptoms of discomfort on her left mandibular second premolar of several weeks duration. The pain was associated with swelling since the past four days. No history of trauma, systemic illness, or drug allergies could be elicited from the patient. Intraoral examination revealed a swelling with mild vestibular obliteration in relation to left mandibular second premolar (Figure 1). Careful intraoral examination failed to detect any caries, signs of trauma or periodontitis. A worn-out tubercle with a focal discoloration was seen on the occlusal surface between buccal and lingual cusp of 35 as shown in figure 1. The tooth showed slight tenderness on percussion.



**Figure 1:** Intraoral view showing mild vestibular obliteration (blue arrow) and 35 with the worn out tubercle (yellow arrow).

Intraoral periapical radiograph of 35 region revealed a periapical abscess with open apex as shown in figure 2.



**Figure 2:** Intraoral periapical radiograph showing 35 with open apex and periapical abscess.

Based on the history, clinical and radiographic findings, a diagnosis of dens evaginatus with periapical abscess and open apex was given. The patient was then referred to the department of Conservative dentistry & Endodontics for further management. The patient was advised the overall treatment plan which included apexification with regenerative endodontic procedure as the apex was still immature. This procedure has several advantages over conventional apexification procedures.

## DISCUSSION

The dens evaginatus (DE) is a developmental anomaly that appears clinically as an accessory cusp or a globule of enamel on the occlusal surface between the buccal and lingual cusps of premolars, unilaterally or bilaterally, although it has been reported to occur rarely on molars, cuspids and incisors.<sup>1</sup> DE is also known as evaginated odontome, occlusal enamel pearl, dilated odontome, tuberculum dentis, odontome of the axial core type, occlusal anomalous tubercle, occlusal pearl, Leongs' premolar, Mongoloid or Oriental premolar.<sup>4</sup> Description of DE was first done by Mitchell in a human tooth in 1892.<sup>5</sup> The term 'Dens Evaginatus' was first recommended by Oehlers in 1967.<sup>6</sup> Dens evaginatus may be seen as an abnormal projection, tubercle, protuberance, excrescence, extrusion, globule or bulge arising from the central groove or buccal or labial to the groove, extending beyond the adjacent tooth structure, consisting of a dentinal core covered by a thin layer of enamel.<sup>1,2,7</sup>

The tubercle often contains pulp tissue which may project at various lengths along the dentinal core.<sup>2</sup> The average height of an intact tubercle is 3 mm, with a 1.5 mm diameter at its base. In 50%, pulp extensions reach into the enamel.<sup>4</sup>

A substantially large tubercle does not tend to break away. If the tubercle fractures or wears away, hardly any sign of the projection is left. As the occlusal pit present may be very small it may be difficult for the untrained eye to detect and the pain due to pulp exposure may pose

a diagnostic challenge. Dens evaginatus is most common among Asian populations and occurs five times more in the mandible than maxilla. It affects females more than males. It is most predominant in mandibular premolars.<sup>1,2,4</sup>

The anomaly develops due to proliferation and evagination of an area of the inner enamel epithelium and transient focal hyperplasia of the peripheral cells of subjacent mesenchymal dental papilla into the enamel organ during early tooth development.<sup>1</sup>

Schulge (1987) has classified DE into five types based on the location of the tubercle in posterior teeth.<sup>8</sup>

Type 1: Cone-like enlargement of the lingual cusp

Type 2: Tubercle on the inclined plane of the lingual cusp

Type 3: Cone-like enlargement of the buccal cusp

Type 4: Tubercle on the inclined plane of the buccal cusp

Type 5: Tubercle arising from the occlusal surface obliterating the central groove.

Based on the pulp content within tubercle, Oehlers has classified DE as wide, narrow, constricted, isolated pulp horn, and no pulp horn.<sup>6</sup>

The tubercle or projection may break off or wear away soon after the eruption because trauma during mastication causes fracture or wear of the tubercle that leads to necrosis of pulp and periapical infection.<sup>7</sup> The rate of pulp necrosis, which usually happens before complete root formation, is 3 - 40%. This usually goes unnoticed and is often discovered as a nonvital tooth with an immature root apex. The absence of an obvious etiology such as caries, trauma or periodontitis obscures the detection of this pathology. The most important clinical finding leading to the diagnosis is the presence of a small, elevated flat wear facet at the occlusal surface as was evident in our case. In addition, our case also revealed a small focal discoloration at the point of pulp exposure resulting from attrition of the occlusal tubercle which could have been missed without a careful examination of the left mandibular second premolar tooth. DE is typically diagnosed when a patient reports with pulpal necrosis or periapical abscess, and careful examination may reveal the presence of a worn-out occlusal tubercle. Alternatively, the tubercle may be progressively worn down, showing no symptoms. Occlusal interferences can occur as a result of DE, leading to accidental cuspal fracture and temporomandibular problems.<sup>10</sup> Osteomyelitis as a complication of DE has also been documented.<sup>11</sup> Radiographically, DE is visible as a radiopaque structure composed of enamel and dentin and occasionally with a pulpal extension. The occlusal surface has a tuberculated appearance, often worn out.<sup>2</sup> It may be seen incidentally on a radiograph even before tooth eruption and root completion. Early pulpal infection leading to nonvital tooth in DE may be misdiagnosed as pulpitis due to trauma in the absence of caries which may be a factor leading to a misdiagnosis of the uncommon dental anomaly. Levitan and Himel<sup>3</sup> proposed a comprehensive classification for the management of DE cases which is as follows:

- Type I: normal pulp, mature apex;
- Type II: normal pulp, immature apex;
- Type III: inflamed pulp, mature apex;
- Type IV: inflamed pulp, immature apex
- Type V: necrotic pulp, mature apex;
- Type VI: necrotic pulp, immature apex.

Treatment options for DE may vary from early recognition and preventive measures such as tubercle preservation, gradual tubercle reduction to conventional endodontic approaches such as root canal treatment, with or without apexification, and/or regenerative endodontics, depending on the severity of pulpal involvement and level of root development.<sup>12</sup> Extraction of type VI DE teeth may be considered an alternative treatment option, due to the uncertain outcome of many these cases.<sup>3</sup>

## CONCLUSION

Dens evaginatus is an uncommon dental anomaly. Diagnosis and management of the affected teeth may be difficult, and often demonstrate immature apices which may require complex endodontic treatment modalities. Early diagnosis and preventive measures are important in the management for these developmental anomalies and endodontic treatment may be successfully applied to save these teeth.

## REFERENCES

1. B Sivapathasundharam. (2020). Shafer's Textbook of Oral Pathology. Elsevier Health Sciences.

2. Neville B, Damm D, Allen C, Chi A. (2016). Oral and Maxillofacial Pathology. Elsevier.
3. M. E. Levitan and V. T. Himel. (2006). "Dens evaginatus: literature review, pathophysiology, and comprehensive treatment regimen," *Journal of Endodontics*;32(1):1-9.
4. Albert Schuurs. (2013) Pathology of the Hard Dental Tissues. Wiley Blackwell.
5. Mitchell W. Death. (1892). *Case Rep Dent Cosm*.34:1036-14000.
6. Oehlers FA, Lee KW, Lee EC. (1967). Dens evaginatus (evaginated odontome). Its structure and responses to external stimuli. *Dent Pract Dent Rec*;17:239-44.
7. van der Vyver PJ, Vorster M, Buchanan GD. (2023). Apexification of dens evaginatus in a mandibular premolar: A case report. *Clin Case Rep*;11:e07316. doi:10.1002/ccr3.7316
8. Kocsis G, Marcsik A, Kokai E, Kocsis K. (2002) Supernumerary occlusal cusps on permanent human teeth *Acta Biol Szeged*.46:71-82.
9. Ayer A, Vikram M, Suwal P. (2015) Dens Evaginatus: A Problem-Based Approach. *Case Rep Dent*.2015:393209. doi: 10.1155/2015/393209. Epub 2015 Dec 8. PMID: 26779353; PMCID: PMC4686639.
10. Cho S, Ki Y, Chu WY. (2006). Management of dens evaginatus: A case report *Hong Kong Dent J*;3:45-7.
11. Allwright WC. (1958). Odontomes of the axial core type as a cause of osteomyelitis of the mandible *Br Dent J*;104:363-5.
12. Chen J, Huang G, Bakland L. (2020). Dens evaginatus current treatment options. *J Am Dent Assoc*;151(5):358-367.