

## Interdisciplinary Approach to Treat Unusual Development of *Dens Evaginatus*: A Case Report

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*The present case report describes a rare case of dens evaginatus on the labial surface of mandibular incisor and interdisciplinary management including endodontic and periodontal treatment. A 10-year-old girl presented unusual whitish tubercle-like structure penetrated through the buccal gingiva of mandibular later incisor. In cone-beam computed tomographic view, pulpal tissue was extended from the principal root to the tubercle. Following full thickness flap reflection, the tubercle was carefully removed, resulting in dentin and pin-point pulp exposure. In order to prevent pulp necrosis and facilitate periodontal attachment to this area, Biodentine and enamel matrix derivative were applied. Gingival defect was compensated using a collagen matrix. Up to 2 years, harmonious gingiva state and no loss of tooth vitality were observed. In summary, dens evaginatus on mandibular later incisor could be successfully treated by means of interdisciplinary approach.*

**Keywords:** *Dens evaginatus; Biodentine; Enamel matrix derivative; Three-dimensional collagen matrix.*

### INTRODUCTION

**D**ens evaginatus (DE) is a rare developmental anomaly characterized by a tubercle-like structure, commonly developing on the occlusal surface of mandibular premolars and palatal surface of maxillary lateral incisors in permanent dentition. The clinical significance of DE is that an abnormal wear or a fracture of the tubercle could lead to pulp necrosis and apical periodontitis due to inclusion of pulp structure in the tubercle.<sup>1</sup> Therefore, the management of DE mainly focuses on the pulpal pathology.<sup>2</sup> DE is usually reinforced by bonding composite resin around the tubercle and to be eliminated potential occlusal interference.<sup>3</sup> However, depending on the location of the DE tubercle, appropriate clinical consideration is required.

The aim of this case report was to describe a rare case of DE on the labial surface of a mandibular incisor and its interdisciplinary management employing endodontic and periodontal treatment.

### Case Report

A 10-year-old girl presented a whitish abnormal tubercle-like structure that penetrated through the keratinized gingiva of the right mandibular lateral incisor (Figure 1a, 1b). The patient had no pain on the tooth, but complained of poor esthetics during speech and smile. Electric pulp test revealed no loss of tooth vitality. The cone-beam computed tomography (CBCT) demonstrated a cusp-like structure with the inclusion of pulp tissue that was diagnosed as DE (Figure 1c, 1d). Because of unusual location of the DE, interdisciplinary consideration was necessary. After removal of the DE, insufficient periodontal support on the denuded root surface was expected. Thin gingival tissue around the DE was considered to be susceptible to gingival recession after the DE removal. Moreover, possibilities of

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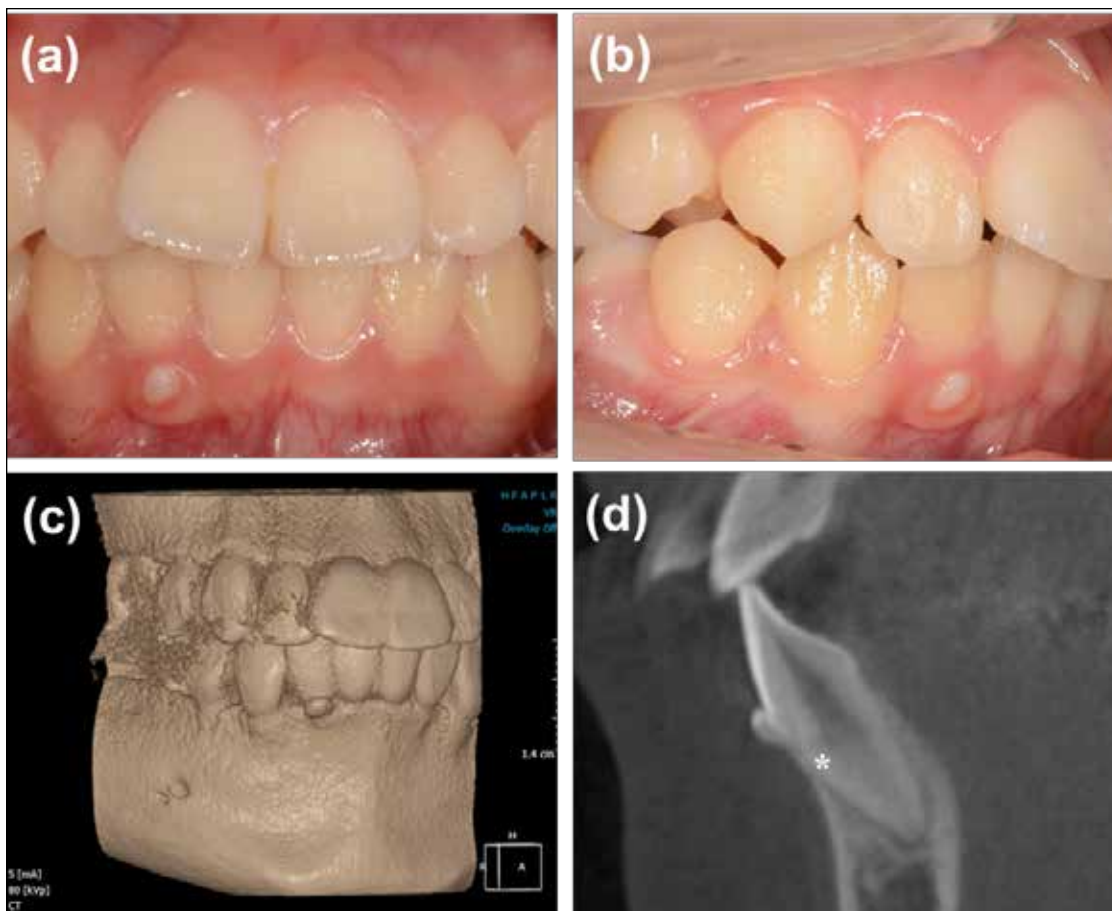
pulp exposure could not be ignored during the removal of the DE, because the communication between the DE and the principal pulp of the tissue was confirmed with CBCT images. Thus, interdisciplinary approach was planned.

A full-thickness flap was elevated after administration of local anaesthesia (lidocaine with 1:100,000 epinephrine). Although the labial crestal bone level of the adjacent central incisor and canine was approximately 0.5 mm lower than the cemento-enamel junction, the bone level of the lateral incisor was approximately 2.0 mm lower than the adjacent teeth due to the presence of the tubercle (Figure 2a). The tubercle was separated using a chisel with a gentle force, resulting in pin-point pulp exposure (Figure 2b). The exposure site was protected from bleeding using gauze, and the irregular root surface was smoothed using a diamond bur. After control of bleeding, Biodentine (Septodont, Saint Maur des Fossés, France) was applied to the exposed site according to the manufacturer's instructions, followed by application of enamel matrix derivative (*Emdogain*<sup>®</sup>, Strauman, Basel, Switzerland) on the exposed dentin area (Figure 2c, 2d). Subsequently, a three-dimensional collagen matrix (*Mucograft*<sup>®</sup> Seal, Geistlich, Wolhusen, Switzerland) was

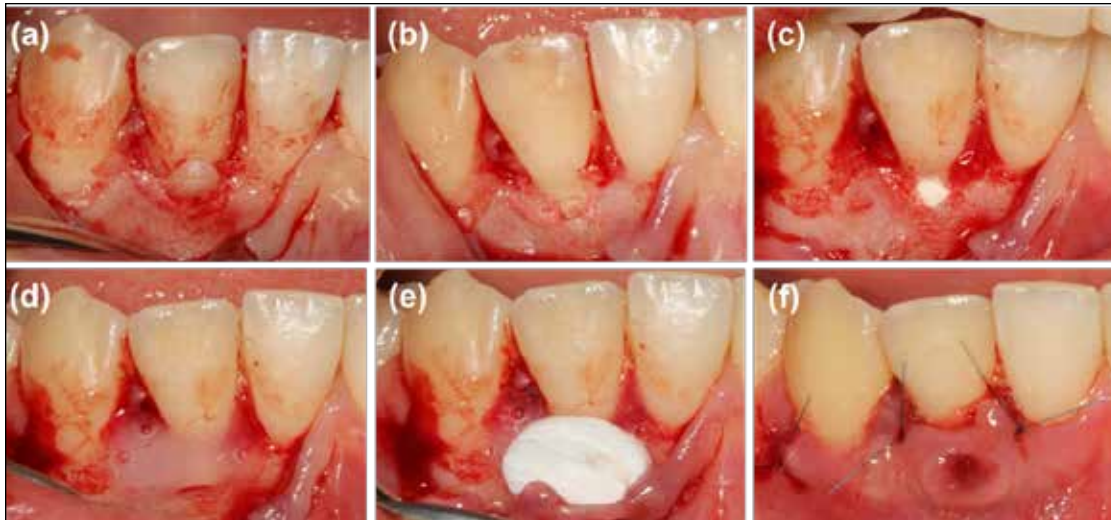
applied onto the dentin area (Figure 2e). The flap was sutured using 6-0 nylon (Ailee Co., Ltd, Seoul, Korea), and chlorhexidine gargle solution (Hexamedin, Bukwang, Seoul, Korea) and antibiotics and analgesics were prescribed for 3 days (Figure 2f).

The removed specimen was stained with hematoxylin and eosin (H&E) after decalcification process (Figure 3a). The histological investigation of the removed tubercle revealed well-differentiated layers of enamel, dentin, predentin, and pulp tissues. Pulpal communication between the DE and principle pulp of the tooth was confirmed (Figure 3b).

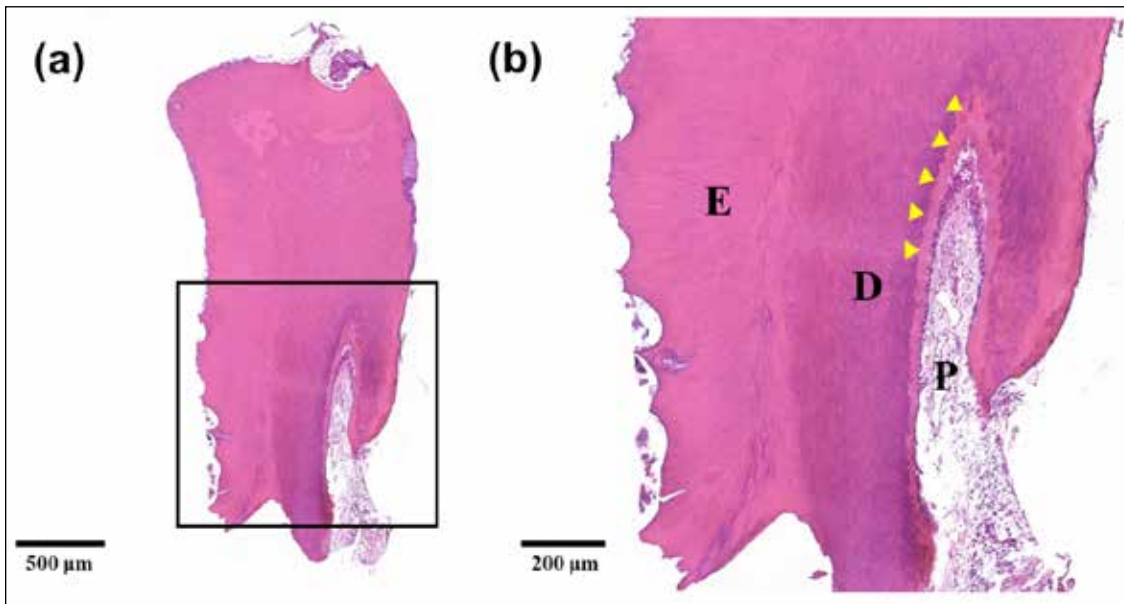
After 1 week, suture-removal was performed after 1 week with no adverse events (no tooth pain or gingival recession). The patient was re-called every 6 months, with no loss of tooth vitality reported. During the 2-year follow-up period, the patient maintained harmonious gingival architecture around the DE tooth (Figure 4a & 4b). The CBCT after 2 years demonstrated no apical pathology of the lateral incisor and similar level of bone crest to the adjacent teeth, but a small depression was seen in the previous location of the tubercle (Figure 4c & 4d). The probing depth was 1-2 mm with no bleeding or gingival recession observed till date.



**Figure 1.** Clinical and radiographic findings of the patient at the initial visit. (a, b) Clinical photographs, (c) A three-dimensional reconstruction of cone-beam computed tomographic scan, (d) A cross-sectional view of the involved tooth. Note that communication between the tubercle and the principal pulp canal (asterisk).



**Figure 2.** Treatment procedure. (a) Elevation of full thickness flap, (b) Removal of tubercle, (c) Exposed pulp covered with Biodentine, (d) Enamel matrix derivative application to the denuded root surface, (e) Collagen matrix application for compensating gingival fenestration, (f) Suturing of the flap.



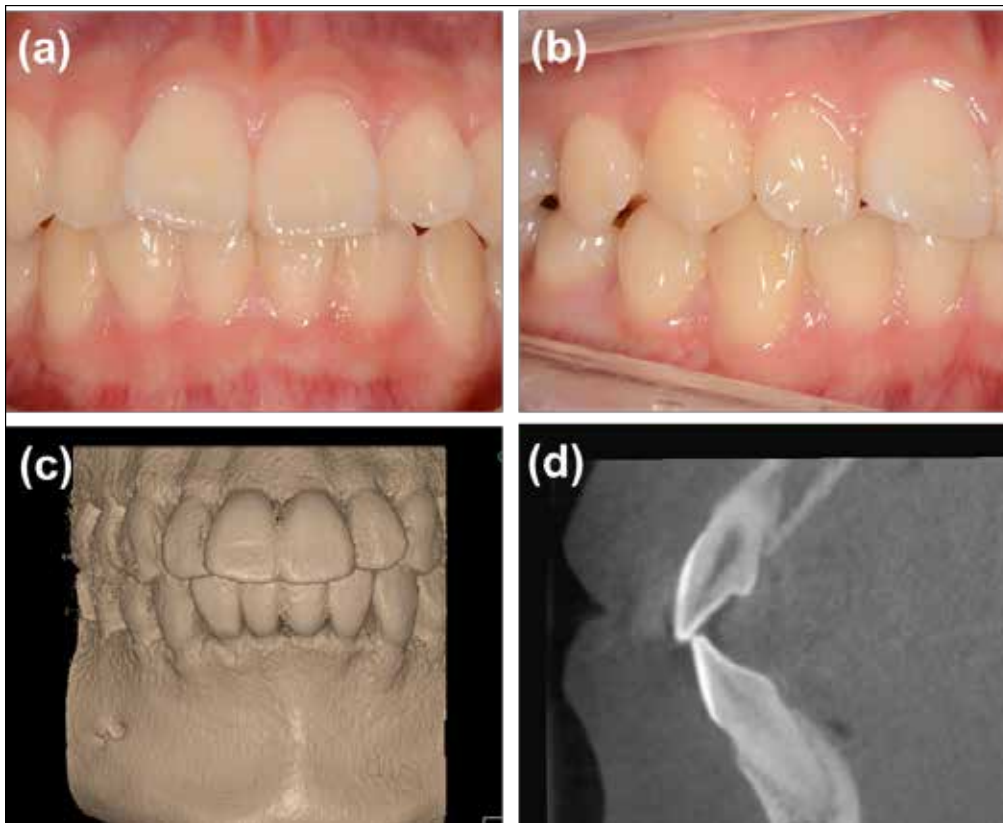
**Figure 3.** Histology of the *dens evaginatus* (DE) tubercle. (a) The whole body of the removed tubercle, (b) High magnification view of the boxed area (E: enamel, D: dentin, P: pulp tissue, arrows: predentin layer, \*: odontoblastic layer, Hematoxylin & eosin stain).

## DISCUSSION

The present case report described a rare case of DE located on the labial surface of a mandibular incisor, and the interdisciplinary approach including periodontal and endodontic treatments leading to successful clinical and radiographic healing.

The pathophysiology of DE is unclear, but it is suspected that abnormal proliferation and folding of the inner dental epithelium and dental papilla during morpho-differentiation stage of tooth development could cause DE.<sup>1</sup> This process leads to inclusion of varying amounts of pulp tissue in the DE tubercle, followed by pulpal necrosis occurring frequently due to trauma or anachoretic pulpitis. Besides, in the present case, the location of DE caused unpleasing appearance for young female patient.

As confirmed with radiographic and histological investigation, the pulpal tissue in the tubercle was in a continuum with the principal pulp. Thus, pin-point bleeding occurred after tubercle removal, and the exposed pulp was covered using Biodentine. Previously, no difference in the success rate of the direct pulp capping was reported between mineral trioxide aggregate (MTA) and Biodentine.<sup>4</sup> In the present case, the characteristics of Biodentine may be advantageous compared to other agents. Constant bleeding from the adjacent tissue and application of enamel matrix derivative required short setting time and non-disturbed sealing property, which was fulfilled by Biodentine.<sup>5,6</sup> Moreover, considering the tooth location and thin gingiva, least discoloration potential of Biodentine was of less concern in terms of esthetics over time.<sup>7,8</sup>



**Figure 4.** Clinical and radiographic findings at the 2-year follow-up. (a, b) Clinical photographs, (c) A three-dimensional reconstruction of cone-beam computed tomographic scan, (d) A cross-sectional view of the involved tooth.

Notably in the present case, enamel matrix derivative and collagen matrix were used in order to compensate loss of periodontal attachment and keratinized gingiva in the area where DE tubercle was located.<sup>9,10</sup> A huge body of evidence demonstrated the capability of enamel matrix derivative for periodontal regeneration.<sup>11,12</sup> The collagen matrix separated the enamel matrix derivative-applied area from oral environment and gave an extra thickness to the gingival defect area at early healing period. This might further support the action of enamel matrix derivative below the matrix and help gingival tissue repopulation on the matrix. The fenestrated gingival area was almost covered with newly formed tissue during suture removal, and became harmonious with the adjacent tissue over time with no pathologic pocket formation.

## CONCLUSION

The location of DE in the present case, the labial surface of the mandibular lateral incisor, was hardly reported. This particular location required interdisciplinary approach including periodontal and endodontic treatment, and successfully managed using Biodentine, enamel matrix derivative, and a collagen matrix.

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