

Multiple Dens Evaginatus on Molars and Premolars: A Case Report

เดนส์อีแวจินาทัส บนด้านบดเคี้ยวของฟันกรามน้อย และฟันกรามแท้: รายงานผู้ป่วย

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บทคัดย่อ

เดนส์อีแวจินาทัส เป็นภาวะผิดปกติอย่างหนึ่งที่
เกิดขึ้นบนฟันที่มักจะพบมากในกลุ่มชนผิวเหลือง
ลักษณะที่พบได้ทางคลินิก คือ เป็นปุ่มยื่นของชั้น
เคลือบฟัน ชั้นเนื้อฟันและอาจมีส่วนของเนื้อเยื่อในด้วย
ปุ่มยื่นนี้มักพบบ่อย บนด้านบดเคี้ยวของฟันกรามน้อย
และอาจพบได้บ้างในฟันกรามแท้และฟันเขี้ยวแท้
รายงานผู้ป่วยนี้เสนอภาวะการมีปุ่มยื่นเดนส์อีแวจินา-
ทัสบนฟันกรามน้อยและฟันกรามหลายซี่ในผู้ป่วย
และการจัดการรักษาปุ่มยื่นเดนส์อีแวจินาทัสนั้น

คำไชรหัส: เดนส์อีแวจินาทัส ฟันกราม ฟันกราม
น้อย รายงานผู้ป่วย

Abstract

Dens evaginatus is a developmental dental
anomaly present in many individuals of
Mongoloid descent. Clinically, it appears as a
tubercular projection of enamel; the tubercle may
include dentin and may enclose pulp tissue. The
tubercle often presents on the occlusal surfaces
of premolars and less frequently on permanent
molars or canines. This report presents a case of
multiple dens evaginatus and addresses the
management of dens evaginatus on affected
permanent premolars and molars.

Key words: dens evaginatus, molar, premolar,
case report

Introduction

Dens evaginatus (DE), is a dental anomaly
most commonly seen in premolar teeth in which a
tubercle extending from the occlusal surface of
posterior teeth, usually in the central groove or on
the lingual ridge of a buccal cusp.⁽¹⁻³⁾ The anomaly
is also referred to as a tuberculated cusp, accessory

tubercle, occlusal tuberculated premolar, evagi-
nated odontome, composite dilated odontome,
Leong's premolar and occlusal pearl.^(1,3-6) It
commonly see in the Mongoloid racial group such
as Chinese, Thai, Malaysians and only occa-
sionally in Caucasians. The prevalence ranges from
1.09 percent to 4.3 percent in the Mongoloid child

population^(1,4,7) with a 1.01 to 1.79 percent in Thai population.⁽⁸⁻⁹⁾ DE can also occur in molars, canines and incisors.^(1,4,10-11) More frequently occurring bilaterally, DE can affect one or both dental arches.⁽²⁾ The occurrence is five times more frequently in the mandible than in the maxilla, with females revealing the condition more often than males.⁽¹²⁾ The condition may occur in association with other dental anomalies such as mesiodens, dens invaginatus, gemination and supernumeraries.^(5,13-14)

The clinical important is the tubercle in DE may fracture easily or become worn away, exposing a fine pulpal extension, which may lead to pulpal necrosis, periapical infection and loss of vitality in caries-free teeth.^(1,4,13,15) The infection can interfere with and arrest root development in a tooth with an open apex.^(1,4) To prevent these complications, DE should be managed soon after the affected tooth have erupted. The purpose of this article is to report a case of multiple symptomatic and asymptomatic dens evaginatus on the affected premolars and molars and the management.

Case report

History

A healthy 11 year, 5 month old Chinese girl presented with the chief complaint of pain in the mandibular left first premolar. She had first complained of "sharp and pointed teeth" in the mandibular left premolar region three months earlier. The occlusal surfaces of all mandibular premolars had been covered with composite resin by a dentist who diagnosed them as affected by DE. Post-treatment, the mandibular left premolar was sensitive to cold air and water and was symptomatic when the child was seen by the authors.

Clinical examination

Examination of the patient's extra-oral and intra-oral soft tissues revealed no anomalies. An intra-oral examination revealed a complete permanent dentition except the maxillary right first premolar which had been extracted to relieve a crowded maxillary arch. The molar relationship was Class I on the right side and Class II on the left side; both arches were crowded. The mandibular left first premolar was tender to percussion, negative in response to a thermal pulp test, and slightly mobile. The occlusal surfaces of all four mandibular premolars were covered with composite resin. Occlusal interferences were noted between the maxillary and mandibular left first premolars. The maxillary left first premolar, maxillary second premolars and maxillary second molars all exhibited the DE anomaly to various degrees of severity, with the maxillary right second molar being most severely affected (Figure 1). Excluding the extracted maxillary right first premolar, nine teeth with DE were noted. The large tubercle on the mesio-buccal cusp of the maxillary right second molars was in contact with the opposing teeth (Figure 2). The maxillary premolars and molars were asymptomatic and responded normally to thermal pulp tests.

Radiographic examination

A small periapical radiolucency around the immature apex of the mandibular left first premolar was noted (Figure 3). The occlusal surfaces of maxillary premolars and second molars showed the typical appearance of DE, comprising enamel, dentin, a very thin extension of pulpal tissue and no evidence of pathology (Figures 4a and 4b).

Treatment

Treatment was conducted in co-ordination with an orthodontist. The orthodontic treatment



รูปที่ 1 ด้านบดเคี้ยวของฟันกรามบนแท้ซี่ที่ 2 และฟันกรามน้อยบนแท้ซี่ที่ 2 ด้านขวา

Figure 1 Occlusal view of maxillary right second premolar and second molar with dens evaginatus



รูปที่ 2 เดนส์อีแวจิ้นเทิส บนด้านบดเคี้ยวของฟันกรามบนแท้ซี่ที่ 2 ด้านขวา ก่อนให้การรักษา จะเห็นว่าปุ่มยื่น เดนส์อีแวจิ้นเทิสสบชนกับฟันคู่สบ

Figure 2 Preoperative clinical photograph of dens evaginatus on the maxillary right second molar which was contact with the opposing tooth.



รูปที่ 3 ภาพถ่ายรังสีแสดงเงาดำบริเวณรอบๆ ปลายรากฟันที่ยังเปิดอยู่ ของฟันกรามน้อยบนแท้ซี่ที่ 2 ด้านขวา

Figure 3 Periapical radiograph at the time of first visit. Radiograph reveals a periapical radiolucency around the immature apex of mandibular left first premolar.

plan was to extract the maxillary left first premolar prior to placing fixed appliances to correct the maxillary centre-line deviation. Under rubber dam isolation, the mandibular left first premolar was opened, the necrotic pulpal tissue was removed, and apexification with calcium hydroxide (Pulpdent paste® Pulp Dent Corp., Watertown, MA, USA) was commenced. The root canal was treated with calcium hydroxide, extending to contact vital apical tissue. The root canal was re-treated with calcium hydroxide at three and six month recalls. Endodontic therapy followed when apexification was complete approximately 11 months later (Figure 5). Twelve months later, the tooth remained normal in color and mobility, not tender to percussion and without radiographic evidence of pathology.

Under rubber dam isolation and without local anesthesia, the maxillary second premolars and second molars were treated with careful grinding of the tubercle into dentin, lined with calcium hydroxide, restored with composite resin, and then fissure-sealed (Figures 6 and 7). The occlusion was carefully checked after treatment. Follow-up



รูปที่ 4A,B

ภาพถ่ายรังสีแสดงปุ่มยื่นเดนส์อีแวจินาตัส บนด้านบดเคี้ยวของฟันกรามน้อยบนแท้ซี่ที่ 2 และฟันกรามบนแท้ซี่ที่ 2 ด้านขวา (ภาพที่ 4A) และปุ่มยื่นเดนส์อีแวจินาตัส บนด้านบดเคี้ยวของฟันกรามน้อยบนแท้ซี่ที่ 2 และฟันกรามบนแท้ซี่ที่ 2 ด้านซ้าย (ภาพที่ 4B) ซึ่งประกอบไปด้วยส่วนของ ชั้นเคลือบฟัน ชั้นเนื้อฟัน และเนื้อเยื่อใน

Figure 4A,B Periapical radiographs of maxillary right and left posterior teeth. Dens evaginatus of maxillary right second premolar and second molar (Fig. 4A) and maxillary left second premolar and second molar (Fig. 4B) consist of enamel, dentine, and the pulp extension.

appointments at three, nine and eighteen months included clinical and radiographic examinations and pulp tests which revealed no evidence of pathology (Figures 8, 9 and 10).



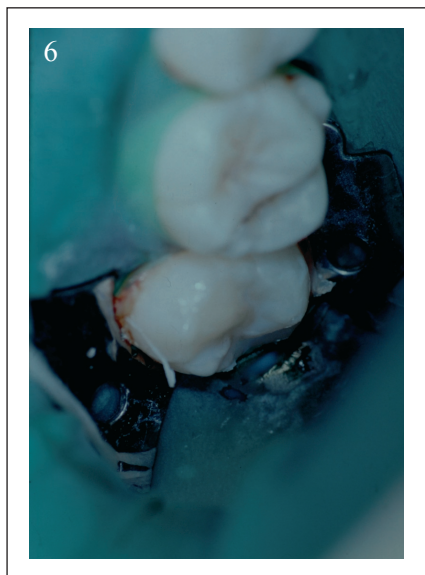
รูปที่ 5

ภาพถ่ายรังสีแสดงการอุดรากฟันที่สมบูรณ์ของฟันกรามน้อยล่างแท้ซี่ที่ 2 ด้านซ้าย ที่มีการซ่อมแซมของเนื้อเยื่อรอบๆ รากฟันแล้ว หลังจากให้การรักษา

Figure 5 Periapical radiograph of completed endodontic treatment of mandibular left first premolar. A complete healing of tooth supporting tissues was noted.

Discussion

Dens evaginatus (DE), is a developmental dental anomaly arising during morphodifferentiation, characterized by a tubercle extending from the occlusal surface of an otherwise morphologically-normal tooth. The tubercle originates in the bell stage, continuing development during crown maturation.⁽¹⁶⁾ The tubercle is thought to be due to an abnormal proliferation of the inner enamel epithelium into the stellate reticulum of the enamel organ, allowing a core of dentin to surround a narrow extension of pulpal tissue.^(1,4,17) Of uncertain etiology, the familial occurrence of DE has been reported and a hereditary component may be involved.^(3,16) The anomaly of DE occurs in the form of a drop, nipple or a pointed, cylindrical cone with pulpal horns presenting as five variants: wide, narrow, constricted, isolated pulpal segments or absent.⁽⁵⁾ In this case, tubercles were present on all premolars and maxillary second molars. Early detection of this anomaly and appropriate treatment are necessary to prevent pulpal complications. Ideally, the condition should



รูปที่ 6,7 แสดงภาพถ่ายด้านบดเคี้ยว (รูปที่ 6) และการกวดสบ (รูปที่ 7) ของฟันกรามบนแท้ซี่ที่ 2 ด้านขวา หลังให้การรักษา

Figure 6,7 Postoperative clinical photographs of maxillary right second molar (Fig. 6-occlusal view) and (Fig. 7-right side view).

be identified by clinical examination and radiographs and diagnosed before the affected tooth erupts fully. However, the patient often presents with clinical signs and symptoms and sometimes of pulpal involvement.⁽¹⁷⁾

Several methods have been described to manage DE. Careful grinding of intact tubercles, followed by application of topical fluoride^(1,16) at frequent intervals was believed to stimulate the formation of secondary dentin and reparative



รูปที่ 8 ภาพถ่ายรังสีแสดงระยะเวลา 3 เดือนหลังจากให้การรักษาในฟันกรามน้อยบนแท้ซี่ที่ 2 และฟันกรามบนแท้ซี่ที่ 2 ด้านขวา

Figure 8 Three months postoperative periapical radiograph of maxillary right second premolar and molar.

dentin.^(5,18) However, the technique has been suggested unreliable.⁽⁵⁾ Several disadvantages of this technique include tooth sensitivity; thinning the tubercle predisposes to fracture and is time-consuming.⁽¹⁻²⁾ Enamel grinding may be successful in cases where no pulpal extension is present, and where the tooth is recently erupted. Fissure sealant or composite resin build-up to support and improve the strength of the tubercle has been claimed as another method.⁽¹⁹⁾ Both the resin and the tubercle then abrade slowly with time, encouraging secondary dentin formation. However, this approach may be impractical in teeth with large tubercles as the composite resin build-up may create occlusal interferences with opposing teeth.⁽²⁰⁻²¹⁾ In the present case, DE of the mandibular left first premolar was treated with a composite build-up by a previous dentist. Two possible reasons are suggested for the subsequent pathology: the fractured or worn-down DE involved a small extension of pulpal tissue prior to treatment, and/or traumatic occlusion occurred due to interference from the composite resin build-up. The endodontic treatment of a tooth with pulpal

necrosis can be further complicated when the tooth has immature apex. In a non-vital, symptomatic tooth with immature root development, apexification with calcium hydroxide followed by endodontic therapy is recommended.^(1,22) Calcium hydroxide has been shown to be effective in inducing hard tissue bridge formation at the apex.⁽²³⁻²⁴⁾ Used traditionally as the intra-canal medication in apexification procedures, calcium hydroxide has a high pH and is bacteriocidal. However, the high pH may induce necrosis of contacting tissues,⁽²⁵⁾ and long-term used of calcium hydroxide may weaken the tooth and predispose root fracture.⁽²⁶⁾ Recently, an interesting technique has been proposed to re-vascularize the apical region of a non-vital immature tooth by disinfecting the root canal with an antibiotic mixture (ciprofloxacin, metronidazole, and minocycline) and mechanically irritating the apex.⁽²⁶⁾ This technique has been demonstrated to successfully re-vitalize the non-vital immature tooth and has overcome the disadvantages of apexification with calcium hydroxide. However, the side effects of the antibiotic mixture are yet to be described.

The large DE on the maxillary right second molar was in contact with the opposing tooth. This tubercle could easily fracture or become worn away through abrasion, leading to pulpitis, if left untreated. Prompt treatment of such a large tubercle is essential. Possible pulpal damage from selective grinding and a traumatic occlusion can complicate the treatment. In the present case, careful grinding of the tubercle into dentin (under rubber dam isolation) followed by indirect pulp capping with calcium hydroxide and placement of a composite restoration was effective in maintaining pulp vitality.^(17,20,27) The technique is also called a selective enamoplasty preventive resin restoration method.⁽²⁰⁾ However, care should be

taken since the danger of pulpal injury may exist from the possible imposition of traumatic occlusion.

Conclusion

The anomaly of DE requires early diagnosis and treatment, as it may result in radicular and periapical pathology. Timely examination and radiographs can assist in diagnosis and planning for long term treatment. There are several treatment approaches for DE. Selective enamoplasty preventive resin restoration method appears to be the most favorable method for asymptomatic vital teeth, and apexification and revascularization may become the treatments of choice in non-vital teeth with incomplete root development.

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