Abstract

A rare case of multiple dental anomalies in a 19-year-old Thai male is reported. Intraoral examination presented a combination of anomalies which involves the entire dentition with no apparent systemic complications. These dental anomalies include shovel-shaped incisors, carnivorous-like crowns and multitubercular crowns. Radiographic findings revealed ten dens invaginatus associated with four periapical radiolucencies and abnormal root shaped molars.

Key words: dens invaginatus; dental morphology; lobodontia; multiple anomalies

Introduction

Developmental alterations of teeth can be classified according to the shape, size, number and structure of the tooth. They may involve a single tooth or multiple teeth in a patient. Differences of dental anomalies may occur in the same individual, and even the same tooth, but multiple anomalies of tooth morphology in the same individual are extremely rare, especially in the entire dentition. Abnormalities of the tooth shape may occur in the crowns or in the roots. Crown morphology may entirely be distorted with the loss of the usual cusp and groove relationship. Examples of anomalies seen in anterior teeth are shovel-shaped incisors, peg-shaped incisors, deep lingual pit and fossa, bifid cingulum, and supernumerary cusp (talon cusp), while the posterior teeth may have the cusp of Carabelli, multitubercular crowns, and even central occlusal cusps. These anomalies may associate with dens evaginatus, dens invaginatus or abnormally shaped roots, which can be revealed by radiographic examination.

The occurrence of multiple dental anomalies which involve the entire dentition is relatively rare. Few studies concerning odd-shaped and barrel-shaped teeth, deep lingual pit or very distinct mamelons in incisors, peak-shaped (fang-like) cusps with a prominent labial lobes in canines, pointed cusps or pyramidal cusps in premolars and multituberculate crowns in molars have been reported. Radiographs revealed dens invaginatus affected in multiple teeth, and single conical root form in molars. The clinical manifestation of the canines were quite conical in shape and the posterior teeth have sharp, cutting teeth similar to the carnivorous species. Witkop described the dentition that appeared in carnivores having fang-like cusp in canines and premolars, and anomalous cusps on molar teeth as “lobodontia”. The teeth of this condition resemble multiple axial core defects, such as dens invaginatus or evaginatus defects.
The aim of this study was to report the clinical and radiographic findings in a new case of lobodontia condition and to review multiple dental anomalies.

Case Report

A 19-year-old Thai male visited the dental clinic at the Faculty of Dentistry, Mahidol University, Bangkok, Thailand for a routine dental examination. He had no significant medical and dental history. No familial history of dental anomalies could be ascertained. The extraoral examination showed a symmetrical straight facial profile. The intraoral examination revealed normal color and texture of oral mucosa, except fistula opening at the left buccal mucosa between the upper first and second premolars. The patient’s teeth revealed 31 permanent teeth, except the lower right third molar. The intraoral photographs, occlusal model, periapical full mouth radiographs were obtained with the patient’s informed consent. The upper left deciduous canine is still retained with a good clinical stability. (Fig. 1A) There were crowding at the upper left premolars, and spacing between the deciduous and permanent canines and also at the lower anterior teeth. (Fig. 1A, 1B) The interarch relationship was crossbite at both anterior and posterior teeth as shown in Fig. 2A and Fig. 2B, 2C, respectively. From the intraoral photographs and occlusal model, the teeth were divided into 4 groups according to morphologic features, as follow:

1. Incisors group: The upper central incisors were shovel-shaped with very distinct three mamelons, while the lateral incisors showed the prominent cingulum with an abnormally deep lingual pits. (Fig. 3A) The lower central incisors were bulbous-shaped with a distinct notch at the incisal edge, while the lateral incisors showed very distinct three mamelons. (Fig. 3B)
2. Canines group: The crown of both upper and lower canines had a prominent convex labial ridge separated by pronounced developmental groove and also showed peak-shaped cusp, especially in the lower canines which slightly curve backward into the cusp tip. (Fig. 3B)

3. Premolars group: The crown of upper and lower premolars showed the reduction in size with non existent lingual cusps, as shown in Fig. 4A, 1A and Fig. 4B, 1B respectively. All of them exhibited the exaggeration of the middle labial lobes with a sharp prominent pointed cusp resembling carnivore teeth morphology.

4. Molars group: The crown of both upper and lower molars was multitubercular in its appearance, as shown in Fig. 4A, 1A and Fig. 4B, 1B respectively. The occlusal surface showed steep ridges separated by deep grooves system with marginal ride tubercles. The upper third molars also exhibited central cusps.

Radiographic examination revealed normal development of maxilla, mandible and temporomandibular joint, except tooth morphology in most dentition. (Fig. 5, 6) The radiographs of upper incisors showed minor form of the invagination with enamel infolding confined to the crown. The premolar radiographs showed the invagination at the coronal region as a blind sac at the upper right premolars, the upper left second premolar, the lower left and right second premolars, while the invagination penetrating and perforating the root apex of the upper left first premolar. Four periapical radiolucencies were found in the upper right premolars, the upper left first premolar and the lower right second premolars. Furthermore, single conical-shaped roots of all upper and lower molars, except the lower left and right first molars, were observed. Moreover, the extensive severe vertical bone loss at the upper left and right first molars was noted.

Due to painless and clinically asymptomatic in affected teeth, the initial diagnosis were pulp necrosis with chronic apical periodontitis for the upper right premolars and lower right second premolar, and chronic apical abscess for the upper left first premolar. The patient was referred to endodontic clinic for root canal treatment of these teeth.
Recently, Metgud et al. have reported a bizarre combination of anomalies which involves single conical unbifurcated molar root forms, taurodontism, dens invaginatus, prominent labial lobes of the canines, pyramidal cusps of the premolars, dens evaginatus of the molars, and localized reduction in tooth size involving the entire dentition without any other apparent systemic complications. We believed that this report is another case of lobodontia condition.

The etiology of multiple dental anomalies remains unclear. However, the genetic and environmental factors may influence on early tooth development. The defective gene may critically be expressed by transmission from X-linked dominant, autosomal dominant or autosomal recessive. Robbins and Keene and Brook and Winder described that the inheritance pattern of multiple dental anomalies is compatible with autosomal dominant trait. The mutation of a single gene can influence the process of odontogenesis during morphodifferentiation which result in the shape of the entire dentition. This phenomenon is supported by Nguyen et al. who found such a phenomenon in two successive generations, although they cannot draw a conclusion. However, our report and Metgud et al. are doubtful because the familial history were not carried out.

In the present case, the different morphologic characteristic found in the incisors is shovel-shaped. This unusual crown morphology which is often considered an anatomical variant rather than a morphological defect because this trait usually occur almost universally with a relatively high frequency rate in the Chinese, Mongoloid, Japanese, Eskimo, and American Indians. Oehlers stated that this morphology usually occurred in the minor form of enamel invagination, as seen in the deep fissuring in the upper central incisors of the our case. The presence of distinct mamelons also remained in the upper central incisors and the lower lateral incisors as well as to the previous reports. Normally, the evidence of distinct mamelons in adult may be found with an anterior open bite relationship by which the teeth do not contact in functions.

Dens invaginatus is a developmental anomaly that dentists should be familiar with. Usually this affects maxillary incisor teeth, particularly lateral incisors. It is uncommon in the posterior teeth and very rare to observe this anomaly in multiple teeth or all quadrants. In earlier studies, many cases of multiple dens invaginatus without other multiple dental anomalies and

**Discussion**

The clinical finding of multiple dental anomalies and radiographic appearances in our case were similar to those described by previous authors. (Table 1) The dentition resembles the early mammalian or Triconodont stage which exhibit three buccal cusps in line in the development of posterior teeth. The largest cusp is centered buccally with smaller cusps located anteriorly and posteriorly. The lower canine occludes into a space between the upper canine and outermost incisor. Some of the teeth can be seen in the carnivorous animals such as Canis familiaris. (domestic dog). The term "lobodontia" have been used to describe this characteristic in human teeth. Gorlin supported this unusual dental anomalies may be hypodontia or general reduction in crown size. The incisors tend to be invaginated or to be shovel-shaped. The cingulum of incisors and premolars is accentuated.

**Fig. 5 Panoramic radiograph showed generalized abnormalities of dental morphology**

**Fig. 6 Periapical radiographs demonstrated ten dens invaginatus (*), four apical radio lucencies (white arrows) and severe vertical bone loss at the upper right and left first molars (black arrows)**
Table 1  Clinical and radiographic appearances of the patients with multiple dental anomalies as lobodontia

<table>
<thead>
<tr>
<th>Authors</th>
<th>Robbins &amp; Keene¹</th>
<th>Shuff ²</th>
<th>Brook &amp; Winder³</th>
<th>Nguyen et al.⁵</th>
<th>Metgud et al.⁹</th>
<th>Present authors</th>
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**Clinical appearances**

**Incisors**
- barrel-shaped incisors: +, -, -, +, -, -
- shovel-shaped incisors: -, -, -, -, -
- very distinct mamelons: +, -, -, +, -, +
- deep lingual pit: +, -, +, +, -, -
- labioincisal groove: -, -, -, -, +
- round incisor corner: -

**Canines**
- peak-shaped (fang-like cusp): +, +, +, +, +, +
- exaggeration of middle lobe: +, +, +, +, +

**Premolars**
- reduction in size with non-existent lingual cusp: +, +, +, +, +, +
- pyramidal (pointed) cusps or canine-like appearance: +, +, +, +, +

**Molars**
- multitubercular appearance: +, +, +, +, +, +

**Abnormal Tooth Numbers**
- Hypodontia / missing tooth: -, +, +, +, -
- Supernumerary tooth: -

**Radiographic appearances**
- multiple dens invaginatus: +(5), -
- single conical / non bifurcated roots: +, +, +, +
- taurodontism: -

**Genetic transmission**
- autosomal dominant: +, +, +, +, ?

+ present, - absent, ? unknown
A patient who has multiple dental anomalies can be part of various syndromes or may relate to other system 8 such as Otodental syndrome, and Oculo-facio-cardio-dental (OFCD) syndrome. These syndromes are genetically transmitted, and may affect many organs leading to poor quality of life. Otodental syndrome - an autosomal dominant syndrome which showing the abnormalities of deciduous and permanent dentition, including large bulbous teeth with malformed occlusal surfaces (globodontia) and high incidence of sensorineural hearing loss. OFCD syndrome - an X-linked dominant syndrome which showing 4 following features (1) dental anomalies i.e. canine radiculo-megaly, delayed dentition, oligodontia, persistent primary teeth, variable root length (2) eye anomalies i.e. congenital cataracts, microphthalmia, microcornea (3) facial abnormalities i.e. long narrow face, high nasal bridge, short nose with broad tip, long philtrum (4) cardiac anomalies i.e. atrial septal defect (ASD),
ventricular septal defect (VSD) including lethal in male. However, the abnormalities of lobodontia occurred only in dentition, not related to other system.

A clinical management or treatment consideration for a patient with multiple anomalies varies among cases. Consultation with Endodontic, Periodontic, Prosthodontic, and Surgery clinics are required as needed. To identify the crown and root morphology, a thorough radiographic evaluation should be examined, including periapical and periodontal status. When the abnormal tooth morphology is observed (such as shovel-shaped crown, deep groove or fissure, exaggerated cingulum pit), the enamel invagination is possibly presented. The clinicians should be aware of this condition, because the high risk of dens invaginatus affected multiple teeth and may have asymptomatic apical inflammatory disease. Prophylactic restoration of the pit and fissure of those teeth is important to avoid possible pulpal injury and related inflammation. In addition, selective grinding or cusp reducing in the pointed cusps may be performed to prevent traumatic occlusion.

Conclusion

The case described in this report is a rare entity of lobodontia condition. The major characteristics of this condition include anomaly of crown shape in almost or entire dentition, multiple dens invaginatus which affects a varying number of teeth, single conical root or non bifurcated root forms in all molars and autosomal dominant trait. A marked variant are hypodontia, missing teeth, and taurodontism. The diagnosis should be based on the clinical and radiographic evaluation, and familial history should also be clarified.

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References


โลปิดคอนเทียครานและเดินสีชิโนแกจินติสุทธิคตแย่ไม่เห็น: รายงานผู้ป่วย

บทคัดย่อ

ผู้ป่วยชายไทยอายุ 19 ปี จากการตรวจในช่องปากพบบริโภคยาหลายอย่างด้านรูปอาจของพื้นที่หลุดได้โดย และไม่มีโรคทางระบบอื่น บริเวณของพื้นเหล่านี้ไม่ประกอบด้วย พื้นรูปริชิตของพันธ์ดิน ด้านที่มีสูงคงคล้ายพันในกลุ่มสิ่งที่เนื้อตัวพันที่มีหลายปัญภาษรังสีแสดงให้เห็นเดือดเช่นแกจินเตี้ย จำนวน 10 ชิ้น ซึ่งมีทางไปผ่าตัดที่ปลายปรากฏว่าตัว จำนวน 4 ชิ้น และรูปร่างของราพื้นสีปกติในพื้นน้ำมัน

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