J Oral Pathol Med (2007) 36: 60–2

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CASE REPORT

Concrescence of teeth: cemental union between the crown of an impacted tooth and the roots of an erupted tooth

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Concrescence of teeth is a condition showing a union of adjacent teeth by only cementum. In all the previously reported cases, the union has been observed between the roots of the affected teeth. Here, we describe the first case that showed a concrescence of the crown of an impacted tooth and the roots of the erupted tooth. In addition, we discuss how this condition, especially the deposition of acellular cementum on the crown, occurred.

J Oral Pathol Med (2007) **36**: 60–2

Keywords: cemental union; concrescence; coronal cementum

Case report

A 61-year-old woman first saw a dentist with a painful swelling of the buccal gingiva at the left maxillary second molar 2 months before visiting our clinic. The symptom disappeared after taking antibiotics prescribed, but it recurred twice. Her dentist tried to extract the tooth, but the extraction was not accomplished because of the pain during surgery. Then, the patient was referred to us.

A periapical radiograph revealed a radiolucency around the roots of the first and second molars, both root canals treated, and the crown of the impacted third molar. In addition, bulbous enlargements suggesting hypercementosis were observed at the roots of the second molar (Fig. 1). A panoramic radiograph showed neither root enlargement of the other teeth nor bone changes of the jaws. After the diagnosis of periradicular periodontitis of the second molar and impaction of the third molar, we planned to extract these teeth under sedation as well as local anesthesia, because the patient feared the teeth being extracted.

First, we tried to extract the second molar, but it was too firm to be extracted. An incision was made at the buccal gingiva of the left maxillary molars and the mucoperiosteal flap was raised. The roots of the second molar were revealed to be united with the crown of the impacted third molar after removal of the overlying bone and the inflammatory tissue around the teeth. Subsequently, these two teeth were forced out in one piece. Finally, the mucoperiosteal flap was approximated with interrupted sutures.

Grossly, the buccal roots of the second molar were united with the crown of the third molar. All roots of the second molar showed bulbous enlargements suggesting hypercementosis (Fig. 2). Macroscopic finding of the cut surface confirmed that the union occurred between the crown of the third molar and the roots of the second molar with resorption (Fig. 3a). Microscopically, the resorbed roots of the second molar were repaired by remarkable amounts of secondary cellular cementum (Fig. 3b). On the other hand, a thin layer of basophilic substance, acellular cementum, was observed on the surface of enamel, which had disappeared by decalcification for making histologic sections, of the impacted third molar (Fig. 3c). These two teeth were united by the cellular and acellular cementum. Based on these findings this case was diagnosed as concrescence of teeth. The postoperative course has been uneventful till now.

Comments

Concrescence of teeth is defined as a union of adjacent teeth by cementum (1). Here, we describe the first case that showed a cemental union between the crown of an impacted tooth and the roots of an erupted tooth.

The occurrence of concrescence requires two basic elements: close approximation of adjacent teeth, and

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Accepted for publication May 10, 2006

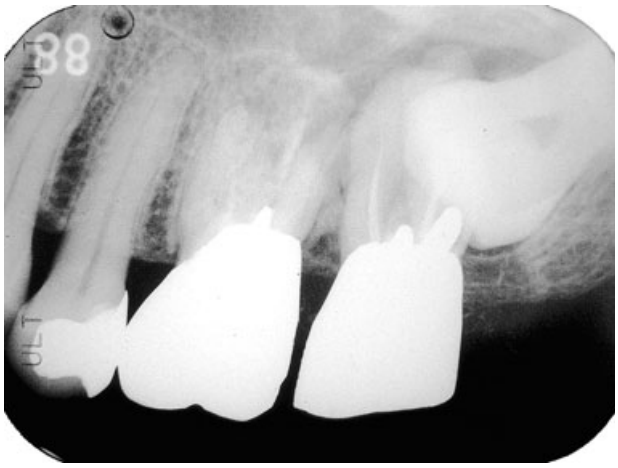

Figure 1 Periapical radiograph shows a radiolucency around the roots of the first and the second molars and the crown of the impacted third molar. In addition, bulbous enlargements suggesting hypercementosis are observed at the roots of the second molar.

Figure 2 The surgical specimen shows the union between the roots of the second molar and the crown of the third molar. Note the bulbous enlargements of the roots of the second molar, which suggest hypercementosis.

deposition of additional cementum causing the union of the teeth (1).

In the current case, deposition of cementum was histologically observed on the root surfaces of the erupted tooth and the enamel surface of the impacted

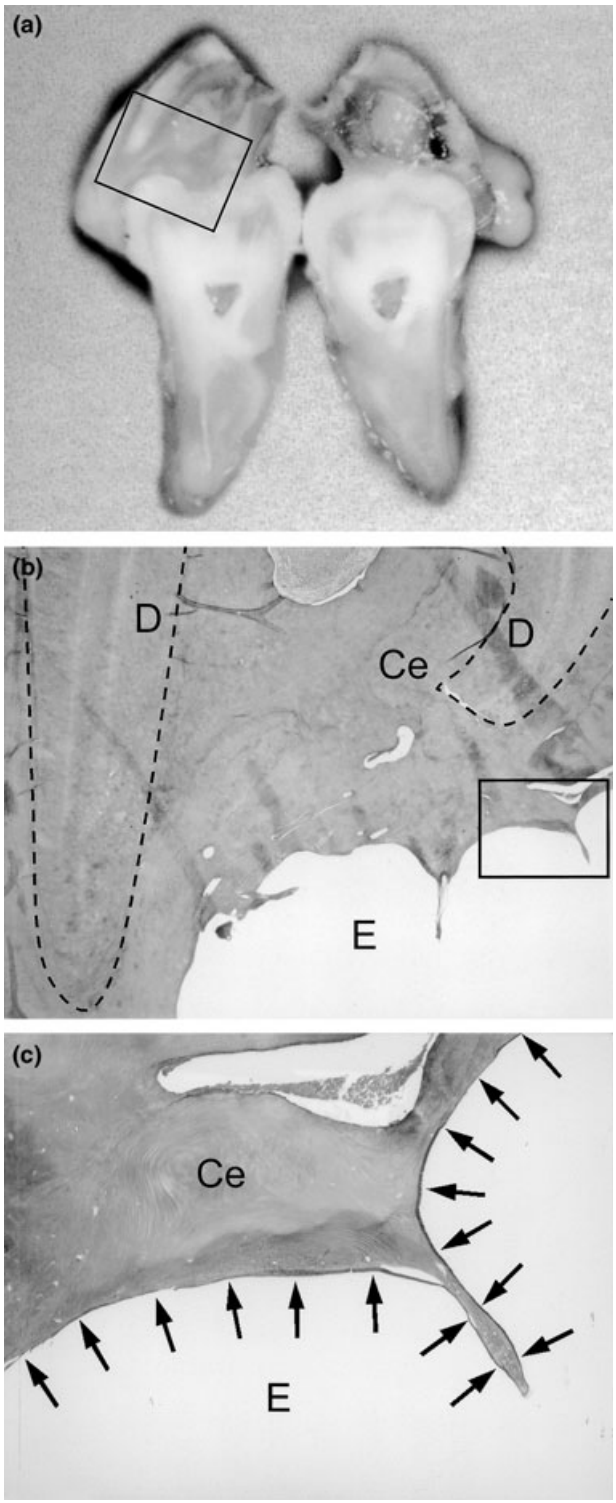

Figure 3 Macroscopic and microscopic appearances of the surgical specimen. (a) The cut surface shows the union between the crown of the third molar and the roots of the second molar with resorption. A rectangle indicates the area from which photomicrograph (b) was taken. (b) Remarkable amounts of cellular cementum (Ce) are observed on the dentin (D) of the roots of the second molar. (E) Enamel space of the third molar. A rectangle indicates the area from which photomicrograph (c) was taken (hematoxylin–eosin, original magnification ×15). (c) A thin layer of acellular cementum (arrows) is observed on the enamel surface (hematoxylin–eosin, original magnification ×75).

tooth. Deposition of excessive amounts of cementum on root surfaces, hypercementosis, is caused by a variety of circumstances (2). These include: (i) inflammation around a tooth, (ii) cemental repair, (iii) elongation of a tooth, and (iv) Paget's disease of bone (osteitis deformans). In addition, hypercementosis of unknown etiology may occur in either a generalized form or in a localized form. The radiograph suggested periradicular inflammation of the second molar (Fig. 1). Moreover, histologic findings of the surgical specimen demonstrated that remarkable amounts of cementum were deposited on the resorbed roots (Fig. 3b). These facts indicate that the periradicular inflammation was a main cause for the hypercementosis in the current case. There were no clinical findings suggesting elongation of the second molar or Paget's disease of bone.

The mechanisms explaining that the coronal enamel of the impacted tooth was covered by cementum are not fully understood. Kronfeld reported that cementum could be deposited in areas where the enamel epithelium degenerated and disappeared (3). He described that degeneration and calcification of the enamel epithelium were frequently seen in sections of impacted permanent molars, although most of these calcifications were observed as the free calcified masses in the connective tissue of the tooth follicle and that cementum occasionally lied on the enamel surface (3). Hammarström described that coronal cementum was formed either in small fenestrations of the covering enamel epithelium or after a more widespread breaking up of the reduced enamel epithelium, and provided evidence that this cementum was a result of cementoblasts induced by enamel proteins (4). Considering their descriptions and the theory of cementogenesis together, the following speculation seems plausible in the current case.

An unknown factor caused the degeneration of the enamel epithelium or the reduced enamel epithelium of the impacted tooth and then the mesenchymal cells of the tooth follicle migrated to the enamel surface of the impacted tooth through dehiscences of the epithelium. This leads to differentiation into cementoblasts and deposited cementum on the enamel surface of the impacted tooth. In concrescence, a union between the roots of adjacent teeth, cellular cementum is generally formed, but in the current case, a thin layer of acellular cementum was observed on the surface of enamel. It has been reported that, during development of tooth, enamel matrix proteins secreted by Hertwig's epithelial root sheath may be important in the formation of acellular cementum on the root surface (5). According to this theory, in the current case, the enamel epithelium or the reduced enamel epithelium, the same lineage of Hertwig's epithelial root sheath, might have secreted enamel matrix proteins before its complete degeneration and these proteins might have induced the formation of acellular cementum. The union between cellular and acellular cementum is considered to have occurred after the formation of acellular cementum, because the coronal enamel of the impacted tooth was completely covered by acellular cementum.

Clinically, the current case indicates that we should suspect the cemental union between the roots and the crown in such conditions as mentioned above.

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