Concrescence of a maxillary first and second molars: A case report

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Running title: Concrescence of maxillary molars

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Abstract

This study reports a case in which partial preservation of concrescent maxillary molars was achieved by root resection.

The patient was a 58-year-old woman who presented with painful gingival swelling around the maxillary right second molar. Periapical and panoramic radiography demonstrated close proximity between the roots of the first and second molars. Dental cone-beam computed tomography (CBCT) revealed that the buccal roots of the second molar were fused with the distobuccal root of the first molar. The patient was clinically diagnosed with chronic periodontitis affecting the maxillary second molar, in addition to concrescence between the maxillary second and first molars. A treatment plan was formulated to preserve the mesiobuccal and palatal roots of the first molar. The distobuccal root of the first molar was horizontally sectioned at the furcation level, after which the second molar and the distobuccal root of the first molar were extracted en bloc.

CBCT provided valuable information for assessing the extent of root fusion during treatment planning. In cases of concrescence between maxillary molars, preservation of the roots not involved in the fusion is feasible when the extent of root fusion is limited.

Keywords: concrescent teeth, dental cone-beam computed tomography (CBCT), conservative treatment, root resection

和文抄録

本論文では，癒着歯を呈した上顎大臼歯に対し，歯根切除を行うことで部分的な歯の保存を試みた症例を報告する．

患者は 58 歳女性で，右側上顎第二大臼歯部の疼痛を伴う歯肉腫脹を主訴に来院した．デンタルおよびパノラマ X 線写真では，第一大臼歯と第二大臼歯の根が近接する所見が認められた．歯科用コーンビーム CT（CBCT）では，第二大臼歯の頬側根と第一大臼歯の遠心頬側根との癒着が確認された．臨床診断は右上第二大臼歯の慢性歯周炎ならびに第一大臼歯との癒着歯であった．第一大臼歯の近心頬側根および口蓋根の保存を目的とした治療計画を立案した．第一大臼歯の遠心頬側根は分岐部レベルで水平的に切断し，第二大臼歯とともに一塊として抜去した．

CBCT は治療計画の立案において根癒着の範囲を評価するのに有用であった．上顎大臼歯の癒着歯症例では，癒合に関与していない根の保存は，癒合の範囲が限局している場合に可能である．

Introduction

Concrescence is a rare dental anomaly in which adjacent teeth are united solely by cementum. However, its developmental mechanism remains largely unclear[1)].

In the diagnosis of concrescent teeth, conventional two-dimensional radiographic imaging often makes accurate assessment difficult because structural overlap and

superimposition are likely to occur[2]. In recent years, the usefulness of three-dimensional imaging evaluation using dental cone-beam computed tomography (CBCT) has been reported for the diagnosis of concrescent teeth[3]. This modality enables more accurate and detailed assessment of root fusion, which was previously difficult to identify using conventional two-dimensional radiographic imaging.

In the management of concrescent teeth, extraction is generally preferred due to the difficulties in diagnosis and the morphological complexity; however, conservative treatment has been reported[4-6].

Here, we describe a case of a maxillary molars with concrescence, in which the fusion status was evaluated using CBCT, and partial preservation of the concrescent teeth was achieved through root resection.

Case report

The patient was a 58-year-old female who presented to our clinic with a chief complaint of painful gingival swelling around the maxillary right second molar. The patient provided written informed consent for inclusion in this report. There were no notable findings in the family or medical history. Intraoral examination revealed gingival swelling around the maxillary second molar and purulent discharge from the periodontal pocket. A metal core was cemented in the second molar, and the first molar served as an abutment tooth for a fixed dental prosthesis (Figure 1). Periodontal pocket depth in the second molar was ≥8mm. Pathological tooth mobility was not observed in the molars. The opposing tooth to the maxillary right molar was missing, and the time of its loss was unknown. Periapical and panoramic radiography exhibited a radiolucent area around the roots of the second molar, and a radiopaque structure overlapping the

Figure 1

Figure 2

roots of the molars (Figure 2). The molars had undergone endodontic treatment. CBCT revealed that the buccal roots of the second molar were fused to the distobuccal root of the first molar (Figure 3). Based on these findings, the patient was clinically diagnosed with chronic periodontitis affecting the maxillary second molar, in addition to concrescence between the maxillary second and first molars. Under local anesthesia, a mucoperiosteal flap was elevated to expose the affected area. The distobuccal root of the first molar was horizontally sectioned at the furcation level using a surgical bur. Due to concrescence, the distobuccal root of the first molar and the second molar were extracted en bloc. Using a diamond bur, the cut surface was contoured to achieve the most gradual transition possible. The extracted teeth findings revealed concrescence between the buccal root of the second molar and the distobuccal root of the first molar. Furthermore, all roots exhibited bulbous morphology, suggestive of hypercementosis (Figure 4). The teeth were kept for examination. CBCT imaging revealed a thin layer of cementum connecting the roots, which was clearly distinguishable from dentin. The cementum layer was thicker around the roots of the second molar than in the distobuccal root of the first molar (Figure 5). Serial sections were prepared and stained. Histological examination revealed cementum fusion between the distobuccal root of the first molar and the buccal roots of the second molar. Layered cementum encircling the apex was present at the apical portion of the buccal root (Figure 6A). In the interradicular areas, cementum layers with orientations distinct from those of the apical region were identified (Figure 6B). Interradicular bone was absent between the roots (Figure 6C). These examinations revealed fusion limited to the cementum, which is consistent with a diagnosis of concrescence. One year after the treatment, the maxillary right first molar maintained stable function as an abutment for a fixed dental prosthesis

Figure 7

Figure 3

Figure 4

Figure 5

Figure 6

(Figure 7).

Discussion

Previous literature on the prevalence of concrescent teeth is limited; however, existing reports indicate that their incidence is low, ranging from 0.019% to 0.36%[7,8]. Concrescent teeth tend to occur in the maxillary molar region, particularly involving the second and third molars[9,10]. Previous studies have reported concresence between two normal molars, between a normal molar and a supernumerary tooth, and in both erupted and impacted teeth[2,9-12]. This case represents a rare instance of concrescence between erupted maxillary first and second molars.

Diagnosis of concrescent teeth typically involves intraoral examination and radiographic assessment using panoramic and intraoral radiography. However, these modalities often fail to accurately identify the presence and morphological characteristics of the fusion[2]. Consequently, there are reports in which concrescence was only confirmed following tooth extraction[2,12]. Romito[13] emphasized the importance of considering concrescence when planning extractions in which the roots of adjacent teeth are radiographically indistinguishable, particularly in the posterior maxilla. Ono et al.[3] performed CBCT for a case involving concrescence between the maxillary second molar and an impacted third molar. Their findings suggest the usefulness of CBCT imaging in treatment planning. In the present case, although a deep periodontal pocket was observed around the second molar, no pathological tooth mobility was detected. Furthermore, conventional two-dimensional radiographic imaging revealed close approximation of the roots of the second and first molars. Therefore, CBCT imaging was performed, which confirmed the presence of a root concrescence involving the

distobuccal root of the first molar and the buccal roots of the second molar. In cases where concrescence with adjacent teeth is suspected, CBCT imaging should be actively utilized to facilitate accurate treatment planning.

As a conservative treatment approach for concrescent teeth, there have been reports of cases in which endodontic therapy[4,5] or separation[6] preserved concrescent teeth in their entirety or enabled partial preservation. In the present case, CBCT imaging revealed root fusion exclusively between the buccal roots of second molar and the distobuccal root of the first molar. The maxillary first molar served as an abutment for a fixed dental prosthesis. Based on these findings, a treatment plan was formulated to preserve the mesiobuccal and palatal roots of the first molar. The distobuccal root of the first molar was horizontally sectioned at the furcation level, and the resected surface was contoured to create a smooth transitional form, allowing preservation of the mesiobuccal and palatal roots without removal of the fixed dental prosthesis. Even in cases where concrescence is observed in multirooted molars, such as the present case, preservation of the roots not involved in the fusion may be feasible when the area of concrescence is localized. This finding may provide a useful reference for future clinical decision-making regarding the management of concrescent teeth.

The etiology of concrescent teeth remains largely unclear. However, two distinct types have been proposed: *true concrescence*, which occurs during odontogenesis; and *acquired concrescence*, which results from hypercementosis typically associated with chronic inflammatory processes[1]. In the present case, the second molar exhibited deep periodontal pockets and periradicular radiolucency, indicating periodontitis. In addition, hypercementosis was observed in all roots of the second molar, which was more pronounced than that seen in the distobuccal root of the first molar. The deterioration

of periodontal tissue function resulting from non-eruption or infraocclusion, and the loss of interdental bone are considered potential factors that lead to tooth concrescence[14]. That is lack of periodontal stimulation in non-erupted or infraoccluded tooth, together with interdental bone approximate the adjacent root and ultimately result in cemental fusion between roots. In the present case, the second molar was without an opposing mandibular molar, resulting in a non-functional occlusal relationship. Furthermore, histological examination revealed fusion of the cementum layers as well as the absence of interdental bone. These findings suggest that chronic inflammation and deterioration of periodontal tissue function of the second molar, and the abscence of the interdental bone associated with hypercementosis collectively contributed to the development of concrescence.

Conclusion

When formulating the treatment plan, CBCT imaging provided valuable information for assessing the extent of root concrescence. Partial preservation of the concrescent maxillary molars was made possible through root resection.

Acknowledgment

We would like to express my sincere gratitude to Shinji Takemoto, Department of Biomedical Engineering, School of Dentistry, Iwate Medical University, who prepared the histological sections, and Atsushi Ogawa, Mikinogahara Dental and Oral Surgery Clinic, for his invaluable assistance in reviewing this report.

Author Contributions

Shotaro Seki performed the treatment. Akira Fujimura performed CBCT imaging of the extracted teeth and subsequently prepared and stained the tissue specimens. Shotaro Seki and Akira Fujimura analyzed and interpreted the data, and wrote the manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Figure legends

Figure 1: Occlusal view of the right maxillary first and second molars

Figure 2: Preoperative two-dimensional radiographic images

A: Periapical radiograph

B: Panoramic radiograph

Figure 3: CBCT images of the right molars (*: anterior, **: palatal)

A: Sagittal view

B: Axial view

C: Schematic diagram of axial view (Orange: roots of first molar, Blue: roots of second molar, LC: layer of cementum)

Figure 4: Photographs of the removed concrescent maxillary right second molar and distobuccal root of first molar

A: Buccal view

B: Palatal view

Figure 5: CBCT images of removed concrescent teeth between the right maxillary second molar and distobuccal root of the first molar. (*: Distobuccal root of the first molar)

A: Sagittal view

B: Cross section at the indicated line of sagittal view

Figure 6: Photomicrography of concrescent teeth between the right maxillary second molar and distobuccal root of the first molar. (Stained with H&E, Bar: 1000 μm, *: Mesiobucccal root of the second molar, **: Distobuccal root of the first molar)

A: Overall View

B: Periapical portion

C: Midroot portion

Figure 7: Postoperative periapical radiograph