

## CASE REPORT

# Concrescence of the right maxillary second and third molars: A case report

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**Abstract**

Herein, we reported a rare case of concrescence of #17 and #18, including the clinical and imaging findings. After extracting the concrescence, the fistula on #17 gradually disappeared. In addition, we analyzed the histological etiology and clinical diagnosis and treatment of concrescence from the sight of periodontal functional stimulation.

**KEYWORDS**

cementum, concrescence, periodontal functional stimulation, periodontal ligament

## 1 | BACKGROUND

Concrescence is an uncommon developmental anomaly of dental tissues characterized by the fusion of the cementum between the roots of two adjacent teeth.<sup>1</sup> Two studies reported the prevalence of concrescence in India of 0.019% in females<sup>2</sup> and 0.09% in males.<sup>3</sup> Moreover, a more recent study reported a prevalence of concrescence in France of 0.3%.<sup>4</sup> So far, only 12 cases have been reported in the English language worldwide (2000–2017).<sup>5</sup> Concrescence frequently occurs in the posterior maxilla. Herein, we presented a single case of a patient with concrescence that may be caused by functional disuse of the right maxillary second and third molars.

## 2 | CASE PRESENTATION

A 55-year-old female patient of Han nationality consulted our department in December 2021 due to repeated swelling and pain in the left and right upper posterior teeth area that lasted for some six months. The patient was missing bilateral mandibular second molars for 18 years; these were never repaired. In addition, the patient was in good physical condition and denied any history of systemic diseases, drug allergy, or family history.

The patient showed facial symmetry; could normally open her mouth (three transverse fingers in width, in a “↓” type). Dental examination indicated the following: 7mm supraeruption of #17; the #17's occlusal surface bite

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to the opposite jaw gum; only the apex of the root was still in the gum, while a fistula developed on the palatal side. Median vertical impaction was found in #18. There were more food residues and soft tartars on the occlusal surface of #17 and #18, accompanied by dental calculus III°. Tooth loss was found in #47 and #48 (Figure 1).

Full-mouth panoramic radiography showed separate root canals for #17 and #18, and a 7mm supraeruption of #27 (tooth extraction in November 2021). In addition, a shadow of the apex of #17 and #27 was observed (Figure 2).

She was diagnosed with severe periodontitis and chronic apical periodontitis of #17, which impacted tooth #18 and concrescence of #17 and #18.

Following local infiltration anesthesia using 1.7 ml of “Primacaine”, the patient underwent the extraction of #17 by dental forceps, during which #18 and #17 were simultaneously dislocated. After extraction, it was observed that the mesial root cervix of #17 was merged with #18, while the crowns were separated. Moreover, a large amount of granulation tissue was found at the root apex of #17 (Figure 3).

One week later, the elimination of the palatal fistula was observed (Figure 4).

### 3 | DISCUSSION

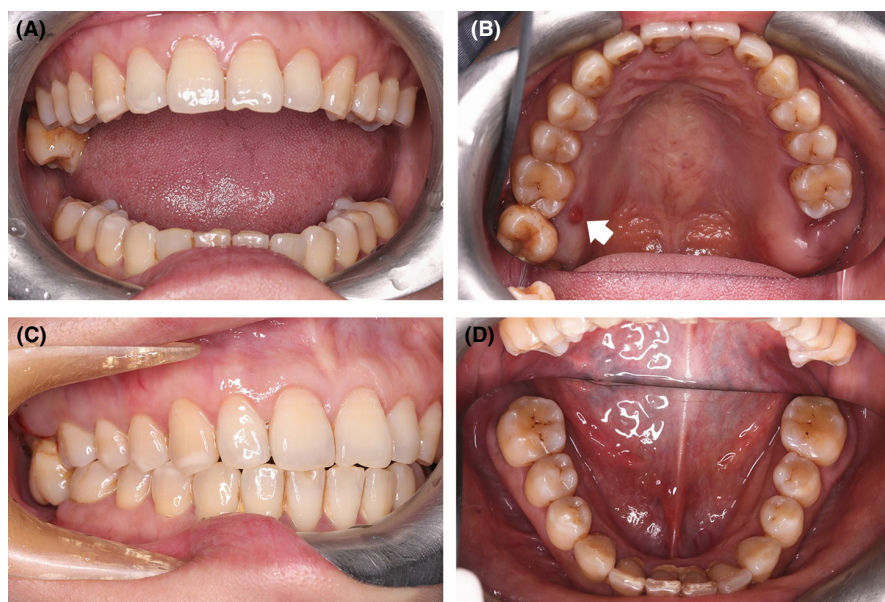
Concrescence is a morphological abnormality that almost always occurs in the region of the posterior maxilla, especially in the third molars, where there is usually not enough bone space to accommodate all the teeth. When there is limited space for independent development of the teeth, there may be a close distance between two or more

affected teeth, and the juxtaposed teeth are united in the cementum, a condition also known as congenital concrescence. There have been reports of concrescence in the first and second molars in the posterior maxilla.<sup>6,7</sup> There are also rare cases of concrescence in central and lateral incisors in the anterior maxilla.<sup>8</sup> Generally, concrescence can be classified into “true” and “acquired” type. The “true” concrescence occurs between two developing teeth, and “acquired” concrescence between two fully formed teeth. The fused tooth results from dentin fusion, which frequently occurs in the anterior teeth, and should be clinically distinguished.

The mainstream view is that the “acquired” concrescence can be caused by inflammation. There may be restorative cementum deposition after the tooth root damage due to inflammation. The cementum deposition between two adjacent teeth may induce the union of the two previously independent teeth. Molars with extensive caries can lead to pulpal cavity lesions and eventually initiate cementum repair. Moreover, the continuously deposited cementum can result in the fusion with the adjacent teeth and even cause bone lesions. However, Consolaro et al. suggested that inflammation caused by trauma or microbial contamination often leads to adhesion of the alveolar bone or root resorption rather than concrescence.<sup>9</sup>

### 4 | THE MECHANISM LEADING TO CONCRESCENCE

Cementum is important to maintain the connection between the tooth and the periodontal ligament. Cementum continuously forms during the lifetime of a tooth. When periodontal fibers are changed and replaced due to

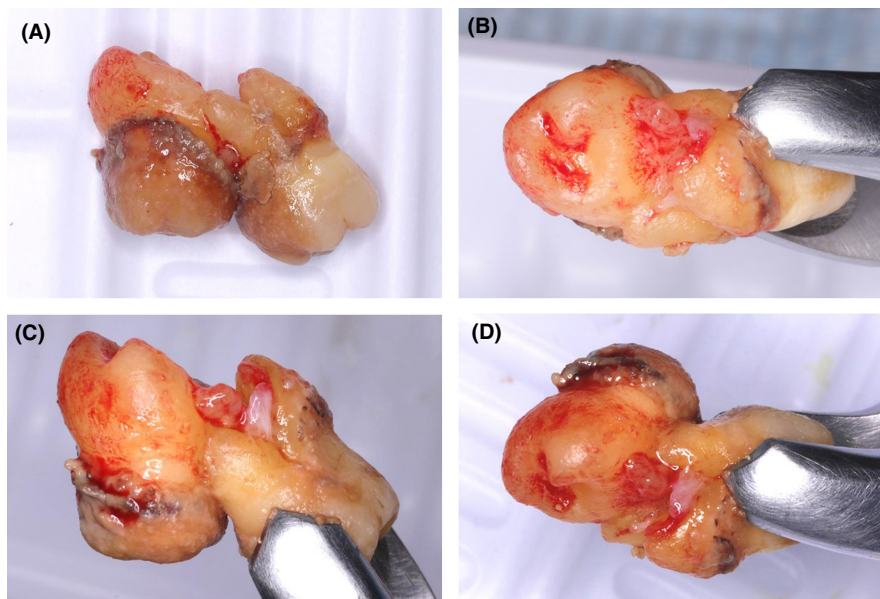


**FIGURE 1** Intraoral images before operation. (A) Frontal image in the mouth opening position. (B) Upper occlusal surface (the arrow indicates the palatal fistula). (C) The right occlusal surface. (D) The lower occlusal surface

**FIGURE 2** Panoramic radiography before the operation (before the extraction of #27)



**FIGURE 3** Extracted concrecence of #17 and #18. (A) Image of the buccal surface. (B) Image of the root apex. (C) Image of the palatal surface. (D) Image of the root apex

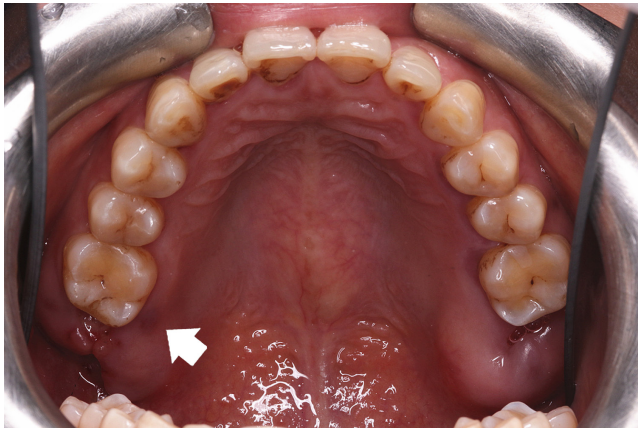


tooth-related functional needs, secondary cementum may be formed through continuous proliferation and deposition. Consequently, new periodontal ligament fibers can reattach to the tooth's root. When there is a small range of pathological resorption or fracture of the cementum on the root surface, the deposition of the secondary cementum promotes its reparation. Inflammation or trauma to the root apex can also lead to resorption of the cementum, which can involve the dentin.

The periodontal ligament can resist and regulate the pressure on teeth in masticatory function, and it can undergo functional adaption under certain conditions. When the required function is reduced, there may be a narrowing of the width of the periodontal ligament, accompanied by a reduction in the number and thickness of collagen fiber bundles. Such functional adaptation may also produce a certain effect on the cementum and the alveolar bone surface. Under normal circumstances, the periodontal ligament must maintain stable width between 0.15 and 0.38 mm, which requires a balance in the reconstruction among the three structures. Any factors

interfering with this balance may lead to abnormal pathological conditions. For example, in the case of a disorder in the differentiation and function of osteoclasts, there may be a tooth eruption failure due to the tooth's adhesion to the surrounding bone. According to Consolaro et al.,<sup>9</sup> the Malassez epithelial rest in the periodontal ligament continuously releases epidermal growth factors (EGFs), thus affecting the periodontal space. Furthermore, owing to the existence of EGF receptors in osteoblasts and its absence in cementum cells, EGF in periodontal ligament stimulates bone resorption on the surface of the alveolar bone, but not the cementum. Therefore, even in the case of quite crowded teeth, there is still no contact between the root of one tooth and the inter radicular bone or the root of another adjacent tooth.<sup>10</sup>

There may be excessive atrophy of the periodontal tissue due to the perennial absence of periodontal functional stimulation. Therefore, the atrophy of the periodontal ligament in unerupted teeth may result in a quite narrowed distance between tooth and bone. It may further lead to the disappearance of the periodontal space and the formation



**FIGURE 4** Intraoral photography after the operation. Photography of the upper occlusal surface (the arrow indicates the elimination of the palatal fistula)

of bone bridges. The alveolar bone adhesion occurs when the teeth are fused with the bone. Similarly, when one of the two adjacent teeth has no significant periodontal activity due to the failure of eruption or infraocclusion, there may be a gradual shrinkage of the bone between teeth and gradual deposition of the cementum, which gets closer to the root of the other tooth. The absence of interdental bone and lack of stimulation of periodontal function can lead to the union at the same level of cementum between the roots of two teeth, even between the roots of one tooth in some cases.<sup>9</sup> In case of encountering two pre-cementum (cementoid) layers that have not yet been mineralized, similar to two "cemented" layers, there may be union and mineralization in both layers, eventually forming concrescence. According to the observation of the histological sections, it is possible to observe an increase in the cellular cementum and increased Salter lines in the cemental–cemental junction.<sup>11</sup>

## 5 | CLINICAL DIAGNOSIS AND TREATMENT OF CONCRESCENCE

Accurate identification of concrescence using intraoral examination is difficult. Concrecence is suspected when there is an image overlap of two teeth when reviewing the films of the X-ray.<sup>11,12</sup> Clinically, X-ray and CT are common tools for identifying and diagnosing concrescence. During imaging, the root may lose the image feature of root independence at some points, with the absence of continuous and well-defined low-density rays. Cementum has a low degree of mineralization, with 50% organic components. Therefore, under the CT scan, there is a slight low-density shadow in the junction area, similar to a newly formed ray around the dentin. Concrecence is extremely rare in the anterior zone and even more unusual between

two functional teeth within the dental arch. Consolaro et al. suggested that the missing of periodontal ligament and space was not possible between two teeth with active periodontal functions.<sup>8</sup> Panoramic radiography or 3D imaging<sup>13</sup> has the advantage of extremely high diagnostic sensitivity, which facilitates diagnosis of concrescence in combination with the clinical experience of dentists.<sup>14</sup> However, cone beam computerized tomography (CBCT) for tooth extraction may not meet the ethical requirements.<sup>15</sup> In our case, there was an image overlap between #17 and #18 during panoramic radiography. Besides, there was no continuous well-defined low-density ray, showing a mutual separation of the dentin, with images of their own canal systems. Therefore, the patient was diagnosed with the concrescence of #17 and #18.

For patients with normal eruption and normal occlusal function in the absence of corresponding clinical symptoms, the concrescence can be temporarily retained, in combination with long-term follow-up. When there is dental pulp disease, it is recommended to adopt filling or endodontic treatment. Foran et al.<sup>16</sup> and Hiroshi et al.<sup>17</sup> suggested using root canal treatment for the concrescences in patients who want to keep their teeth. Meanwhile, concrescence can also be retained if the missing or defective adjacent teeth could be replaced using orthodontics or prosthetics. It is achieved by cutting to separate and extract one non-functioning tooth if necessary.<sup>18</sup> Tooth extraction is advisable when the concrescence compromises the appearance and oral hygiene and may lead to diseases such as periodontal disease, pericoronitis, and root resorption of adjacent teeth. However, special attention should be paid to prevent complications such as a fracture in the buccal bone plate, maxillary tubercle, maxillary sinus floor, maxillary sinus perforation, etc.<sup>19</sup> In this case, the pain and inflammation disappeared after extraction, and the second molar was timely restored.

## 6 | CASE SUMMARY

This case was diagnosed with "acquired" concrescence of #17 and #18. The patient was without #47 for 18 years. Due to the long-term disuse of occlusal function, a 7mm supraeruption of #17 to the opposite gingiva occurred. The narrowing part of the mesial root cervix of #17 was just stuck in the enlargement part of the distal crown of #16, which limited further movement of #17. Meanwhile, #18 showed the characteristic of mesial movement of the natural tooth, which was to compensate for the interproximal attrition to maintain the normal adjacency. The movement continuously compressed the mesial alveolar bone of #18, resulting in complete absorption of the bone. Due to the disuse

atrophy of the #17 periodontal ligament, a narrowing of the periodontal space and deposition of the cementum surrounding #17 and #18 were seen, resulting in their union and eventually concrescence. This may be attributed to poor dental hygiene of #17 and #18 concrescence, causing retrograde infection of the dental pulp and finally leading to apical periodontitis. However, given the relatively few clinical cases of concrescence, this should be further explored with respect to the etiology.

Timely restoration or implant treatment is necessary for cases with missing teeth in clinical practice so as to restore a good functional occlusion, which is the optimal solution for maintaining oral health.

## AUTHOR CONTRIBUTIONS

Yan Xu performed surgery, photography, and conceptualization; wrote original draft; reviewed and edited the manuscript. Jin Sun involved in visualization and performed software.

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None.

## CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

## DATA AVAILABILITY STATEMENT

None.

## ETHICAL APPROVAL

None.

## CONSENT

The patient has consented to the submission of the case. Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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