

CASE REPORT

Incidental Intraoperative Detection of Root Union Suggestive of Concrescence Between the Mandibular Second and Third Molars: A Rare Case Report

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ABSTRACT

Concrescence is an uncommon developmental dental anomaly characterized by the union of two fully formed teeth through cementum without involvement of dentin. It most frequently affects posterior maxillary teeth, particularly the second and third molars, whereas mandibular involvement is exceptionally rare. Because conventional radiography may fail to reveal root union, the condition can remain undiagnosed until extraction. This case reports concrescence involving the mandibular second and third molars and highlights its diagnostic and surgical implications. A 42-year-old male presented with pain associated with the mandibular left second premolar and second molar. Clinical examination revealed caries involving the second premolar and gross caries with Grade I mobility of the second molar. An intraoral periapical radiograph demonstrated carious involvement but did not adequately visualize the adjacent third molar, and no evidence of root union was identified. Following refusal of endodontic treatment, extraction of the second molar was performed under local anaesthesia. During the procedure, the mandibular third molar was unexpectedly delivered together with the second molar as a single unit. Examination of the extracted specimen demonstrated union of the roots through cementum, suggestive of concrescence. The extraction socket healed uneventfully without postoperative complications. Concrescence involving the mandibular second and third molars is an exceptionally rare finding that may remain clinically and radiographically unsuspected until extraction. This case emphasizes the limitations of conventional radiographic assessment, the importance of considering developmental root anomalies in closely approximated posterior teeth, and the need for

preoperative assessment and patient counselling regarding unexpected findings and altered surgical management.

Introduction

Developmental anomalies involving union of adjacent teeth are uncommon and include gemination, fusion, concrescence, and syndontia. Distinguishing these entities can be challenging because their developmental processes cannot be directly observed clinically. Fusion results from union of two developing tooth germs with continuity of dentin, whereas concrescence is union of two fully formed teeth through cementum without involvement of dentin or pulp chambers. The affected teeth therefore usually retain normal crown morphology and separate pulp systems, making clinical diagnosis difficult without advanced imaging or histopathological examination [1,2].

Concrescence may be developmental (true) or acquired. Developmental concrescence occurs during root formation when adjacent teeth are closely positioned, whereas acquired concrescence develops after root formation because of excessive cementum deposition associated with chronic inflammation, trauma, occlusal dysfunction, loss of interdental bone, or prolonged functional disuse [2,3,4]. Although its exact prevalence is unknown, concrescence is rare and occurs predominantly in the posterior maxilla, most commonly between the maxillary second and third molars or between a third molar and supernumerary tooth. Mandibular involvement, particularly between the second and third molars, is exceptionally uncommon [2,5,6].

Preoperative diagnosis is difficult because conventional two-dimensional radiographs, including intraoral periapical and panoramic radiographs, may not demonstrate cemental union because of root superimposition. Cone-beam computed tomography (CBCT) provides superior visualization of root morphology and is preferred when root union is suspected, as routine clinical and two-dimensional radiographic assessment may be insufficient [3,4,7,8]. However, CBCT is not routinely indicated for uncomplicated extractions, and many cases remain undetected until surgery.

Failure to identify root union before extraction may result in inadvertent removal of an adjacent tooth, root or alveolar bone fracture, prolonged surgical time, and alteration of the planned

treatment approach. It may also have medicolegal implications if patients are not counselled regarding possible adjacent tooth involvement and may necessitate reconsideration of conservative treatment options where feasible [3,4,9,10]. Awareness of this anomaly is therefore important during posterior tooth extraction, particularly when teeth are closely approximated to impacted or partially erupted neighbours.

We report a rare case of unexpected simultaneous extraction of the mandibular second and third molars due to root union suggestive of concrescence, discovered during routine extraction of a grossly carious mandibular second molar. This case highlights the limitations of conventional radiography, the importance of considering developmental root anomalies, and the clinical implications of unexpected root union during routine extraction.

Case Description

A 42-year-old male presented to the Department of Oral Medicine and Radiology with pain in the lower left posterior jaw for one month. His medical history was significant for diabetes mellitus for five years, managed with regular medication. No other relevant medical or surgical history was reported.

Clinical examination revealed deep caries involving the mandibular left second premolar (35) and second molar (37). An intraoral periapical radiograph (IOPAR) of the mandibular left posterior region included teeth 34, 35, 36, and 37, with only the coronal portion of tooth 38 visible (Figure 1). The radiograph showed carious involvement of 35 and 37 without apparent evidence of a developmental root anomaly or root union. Because the roots of 38 were outside the radiographic field, their relationship with 37 could not be assessed preoperatively.

The patient was referred to the Department of Conservative Dentistry and Endodontics for evaluation of 37. Clinical assessment confirmed the diagnosis, and electric pulp vitality testing demonstrated that teeth 35 and 37 were vital. Root canal treatment was advised for 35 and 37; however, the patient declined endodontic treatment and opted for extraction. He was subsequently referred to the Department of Oral and Maxillofacial Surgery.

Extraoral examination revealed no facial swelling,

lymphadenopathy, or restricted mouth opening. Intraoral examination confirmed a grossly carious 37 with Grade I mobility and bleeding on probing (BOP). Tooth 35 had a deep carious lesion. The mandibular left third molar (38) was fully erupted and clinically normal. Percussion elicited tenderness in 35 and 37, whereas 38 was non-tender.

After discussion of treatment options, including the risks and benefits of endodontic therapy and extraction, the patient reiterated his preference for extraction. Written informed consent was obtained.

Under strict aseptic precautions, local anaesthesia was achieved using inferior alveolar, lingual, and long buccal nerve blocks with 2% lignocaine containing 1:80,000 adrenaline.

Extraction of 35 was performed atraumatically using a periosteal elevator followed by mandibular premolar forceps.

Attention was then directed to 37. Initial luxation was performed using a periosteal elevator and Coupland elevator, followed by mandibular molar forceps. During elevation and delivery, unexpected resistance was encountered, and 38 was simultaneously delivered with 37 as a single unit.

This finding had not been anticipated because the available IOPAR included only teeth 34, 35, 36, and 37, with merely the coronal portion of 38 visible. As the roots of 38 were outside the radiographic field, the relationship between the roots of 37 and 38 could not be evaluated preoperatively.

Macroscopic examination of the extracted specimen demonstrated root union between 37 and 38, suggestive of concrescence (Figure 2 and Figure 3). In the absence of CBCT or histopathological examination, definitive cemental union could not be established.

Following extraction, the sockets were irrigated with povidone-iodine (Betadine) solution followed by sterile normal saline (Figure 4). Haemostasis was achieved, and the socket involving 37 and 38 was approximated using 3-0 black braided silk sutures (Figure 5). Standard postoperative medications and instructions were provided. A postoperative radiograph was not obtained, as there was no clinical indication after the uneventful extraction.

The patient was reviewed one week postoperatively. Healing was satisfactory, with no infection, wound dehiscence, dry socket, or neurosensory deficit. Sutures were removed, and healing remained uneventful.

Discussion

Union anomalies between adjacent teeth have historically been grouped under the broad heading of "dental twinning," which includes gemination, fusion, concrescence, and syndontia. Killian and Croll emphasised that precise diagnosis may be difficult clinically because the complete embryological history of affected teeth cannot be observed [1]. In the present case, 37 and 38 were fully formed, separate teeth with apparently normal morphology, and the tooth count was not reduced. These features favour concrescence, a purely cemental root-surface union, rather than true fusion, which involves dentinal confluence and generally results from union of two tooth germs earlier in development [1,2]. Recent reports of double teeth, fusion, and concrescence similarly demonstrate the diagnostic challenge and emphasise that definitive distinction may require histological or high-resolution imaging confirmation [11-15].

The principal differential diagnoses were fusion, gemination, hypercementosis, and ankylosis. Fusion was considered less likely because the specimen showed two morphologically distinct crowns without clinical crown union, and the tooth count was unaffected. Gemination typically results from incomplete division of a single tooth germ and presents as a bifid crown with a single root canal system. Hypercementosis causes excessive cemental deposition but generally affects an individual tooth without union to an adjacent tooth. Ankylosis represents fusion between a root surface and surrounding alveolar bone rather than between adjacent teeth. Although the specimen strongly suggested root union consistent with concrescence, the absence of histopathological examination and CBCT precluded definitive confirmation. The finding is therefore best described as root union suggestive of concrescence.

Concrescence is classically described in the posterior maxilla, most often between a maxillary second molar and an adjacent impacted third molar or supernumerary tooth, reflecting limited space for independent root development [2,5,6]. Mandibular

involvement, particularly between the second and third molars, is considerably rarer and has been reported only occasionally [2,6]. Recent literature also describes diagnostically challenging fusion-, gemination-, and concrescence-type anomalies involving mandibular second and third molars, which can be difficult to classify using conventional imaging alone [16,17,18]. Proposed causes of acquired concrescence include chronic periapical or periodontal inflammation, crowding or limited interproximal space, trauma, and prolonged functional disuse, all of which may promote excessive cemental deposition between closely approximated roots [3,4]. Xu et al. attributed a case of maxillary second-third molar concrescence to functional disuse [19], while a recent report described progressive generalised hypercementosis evolving into acquired concrescence under chronic occlusal overload, suggesting that excessive cemental apposition may contribute to root union [20].

From a diagnostic standpoint, concrescence is difficult to identify on conventional two-dimensional radiographs because overlapping root outlines may mimic simple superimposition. CBCT has been advocated as a more reliable preoperative diagnostic tool when concrescence is suspected because it can demonstrate an indistinct boundary between adjacent roots that may not be appreciable on two-dimensional films [3,4,7]. In the present case, the IOPAR was centred on 35–37 and did not include 38; therefore, the anomaly could not have been anticipated. This highlights a practical point: when a posterior tooth planned for extraction lies close to an adjacent unerupted or partially erupted molar, extending the radiographic field to include the neighbouring tooth may reveal otherwise unsuspected root union.

Clinically, unrecognised concrescence may result in unplanned removal of an adjacent tooth, increased operative difficulty, and root or alveolar bone fracture, with associated medicolegal implications if removal of the neighbouring tooth has not been discussed [3,4]. Similar unplanned outcomes and surgical complications have been reported during third molar surgery, even when performed by experienced operators, demonstrating that concrescence can remain unsuspected in different clinical settings [9,21]. When concrescence is suspected or identified

intraoperatively, careful surgical technique and thorough socket debridement are advisable. The patient should also be informed of the finding and its implications for future treatment.

Conclusion

Concrescence between the mandibular second and third molars is a rare anomaly that may remain clinically and radiographically silent until extraction. This case highlights the importance of considering root union when a posterior tooth planned for extraction lies close to an adjacent molar, extending radiographic coverage where feasible, and counselling patients about the possible need to manage an adjacent tooth found to have root union during surgery. Awareness of this anomaly and appropriate imaging when clinically indicated may reduce intraoperative surprises and improve surgical planning.

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References



Figure 1: Preoperative intraoral periapical radiograph showing teeth 34–37, with only the coronal portion of 38 visible



Figure 2. Buccal view of the extracted mandibular second and third molars showing root union suggestive of concrescence



Figure 3. Lingual view of the extracted mandibular second and third molars showing root union suggestive of concrescence.



Figure 4. Intraoral view of the mandibular left posterior extraction socket following extraction.



Figure 5. Postoperative intraoral view showing approximation of the extraction socket with sutures.