

AN UNUSUAL TRIAD OF DENTAL ANOMALIES—FUSION, SUPERNUMERARY AND DENS INVAGINATUS OF THE MANDIBULAR THIRD MOLAR

REN-JYE CHEN, JIA-FURE YANG, CHENG-CHUNG LIN,
CHUNG-HO CHEN and LI-MIN LIN

A case of fusion of the mandibular right third molar with an invaginated supernumerary interradicular molar is reported. To our knowledge, this is the first report to describe such a combinative dental anomaly in a single tooth.

Key words: fusion, dens invaginatus, supernumerary tooth

(*Kaohsiung J Med Sci* 2: 353-359, 1986)

Fusion of the molars, supernumerary interradicular molar and dens invaginatus in the molar are three relatively uncommon dental anomalies. The simultaneous occurrence of all three abnormalities has not been reported in dental literature. In this article, we report a case of fusion of a mandibular third molar with an invaginated supernumerary interradicular molar.

CASE REPORT

A 21-yr old Chinese female patient was referred to our dental clinic to extract her decayed mandibular right third molar. Clinical examination of the oral cavity disclosed a partially erupted, mesial inclining impacted mandibular right third molar. It revealed a large decayed cavity on the occlusal and mesial surfaces of the crown. Panoramic radiograph showed the impacted mandibular right third molar fused with a round shaped radiopaque mass which was engaged in the interradicular region between the mandibular right second and third molar (Fig. 1). Apical radiograph of the affected tooth revealed a supernumerary tooth with a distinct crown proper and correlative dental follicle fused to the mandibular right third molar (Fig. 2). The pulp chamber between the fused supernumerary tooth and the mesial

roots of the third molar was dilated in confluence. A balloon shaped invagination with enamel-like radiopacity arising from the crown of the supernumerary component of the fused tooth was discernible radiographically. The fused tooth was removed by a surgical procedure under local anesthesia, and the healing of the patient was uneventful.

The extracted fused tooth had two separate crowns: a crown of the third molar proper and a crown of the supernumerary component. Besides a large decayed cavity, an area of the enamel hypoplasia on the mesiobuccal surface of the mesiobuccal cusp of the third molar was noted (Fig. 3A). The crown of the supernumerary component was dome shaped, 0.9 cm in diameter, with a deep fossa in the central portion of the crown. The root portion of the supernumerary component was spherical shaped, 1.3 cm in diameter, with many foramina in the apical region (Fig. 3C). Both the mesiobuccal and mesiolingual roots of the third molar were dilacerated and fused with the supernumerary component on their mesial side (Fig. 3A and B). A prominent crest extending from the intercoronal area to the lingual surface of the fused tooth also was noted (Fig. 3B).

Vertical section was done through the central fossa of the supernumerary component and the central groove of the third molar proper. It revealed a dilated pulpal space between the canal wall of the mesiolingual root of the third molar and the inner

School of Dentistry, Kaohsiung Medical College, Kaohsiung City 80731, Taiwan, Republic of China.



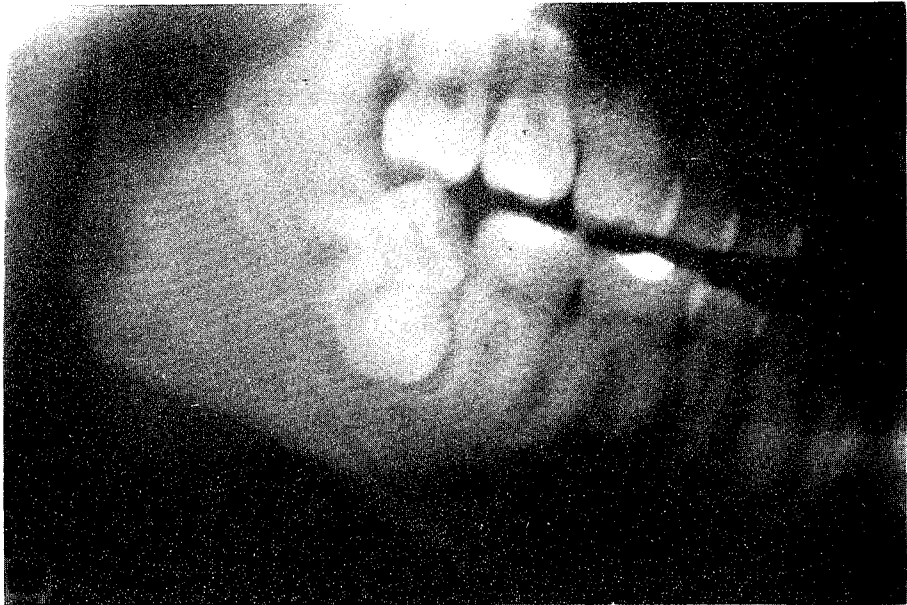


Fig. 1. Panelipso pantomograph showed a radiopaque mass fused with the mandibular right third molar.

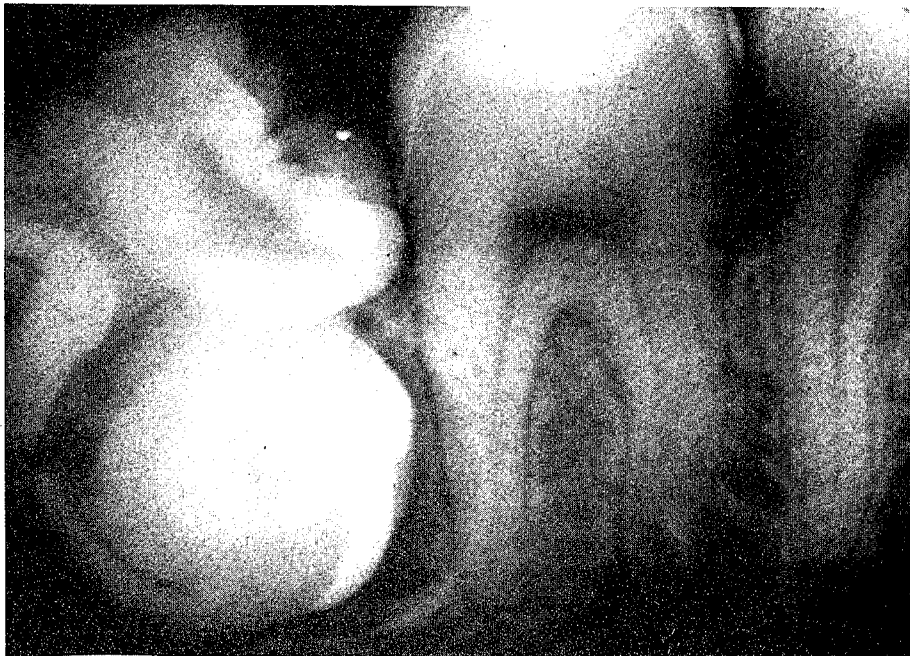


Fig. 2. Periapical radiograph of the affected tooth disclosed fusion of the mandibular right third molar with a supernumerary interradicular molar. A balloon shaped invagination arose from the crown of the supernumerary molar.

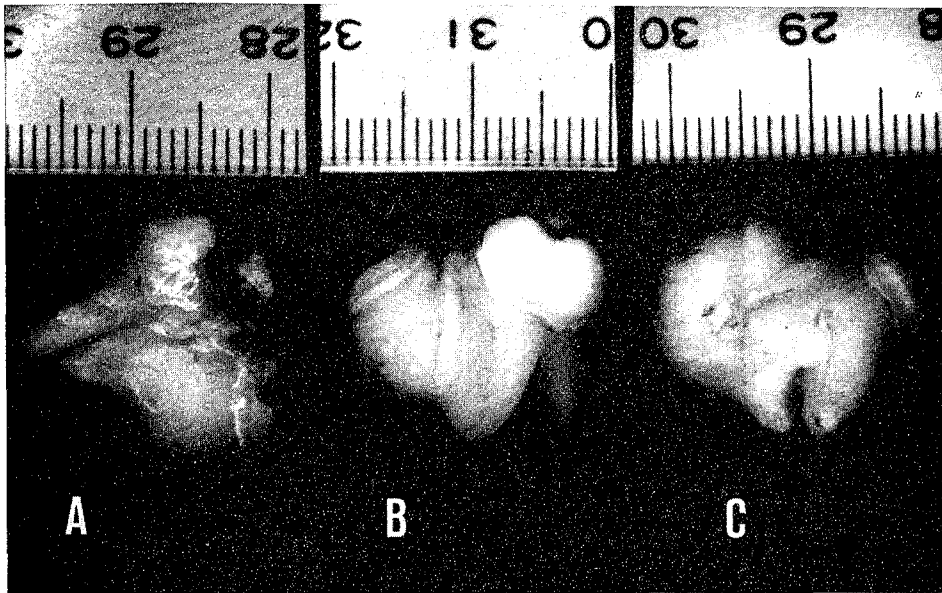


Fig. 3. Specimen of extracted fused molar. A: Buccal aspect of the specimen. Enamel hypoplasia on the mesiobuccal cusp of the third molar was noted. B: Lingual aspect of the specimen. A prominent crest located between two fused components. C: Apical aspect of the specimen. Many foramina were found in the apical region of the supernumerary component of the fused tooth.



Fig. 4. Cut surface of the lingual half of the specimen.

surface of the root portion of the fused supernumerary component (F.g. 4). The cut surface of the supernumerary component showed some whitish material, with many clefts, extending from the central fossa of the crown into the central area of the radicular mass (Fig. 4).

The ground section of the supernumerary component of the fused tooth disclosed a cluster of enamel embedded in the dentin (Fig. 5). Many prominent clefts were found in the invaginated enamel. These clefts extended to the dentinoenamel junction, and made the area devoid of lining enamel (Fig. 6). However, the underlying dentin was intact. The dentinoenamel junction of the invaginated enamel was zigzag in circumscription, and was exaggerated in scalloping. A fan-like arrangement of the dentinal tubules was noted in the area of the prominent crest of the intercoronal area (Fig. 7).

DISCUSSION

Fusion of the molars is a relatively

uncommon dental anomaly. Most reported cases were found with the fusion of a third molar to a distomolar^(1,4). Rarely have cases been reported with the permanent second and third molars involved^(5,6), or with the primary molars affected⁽⁷⁾. The occurrence of supernumerary interradicular molars is much rare than that of the paramolars and the distomolars⁽⁸⁾. However, the fusion of a mandibular third molar with a supernumerary interradicular molar, as in our case, has not been reported previously.

The etiology of fusion has not been determined. Spouge⁽⁹⁾ proposed the crowding of the adjacent tooth germ may result in fusion. Shafer and his co-authors⁽¹⁰⁾ suggested that "physical force or pressure produces contact of the developing teeth" was the cause of fusion. Lowell and Soloman⁽¹¹⁾ reported that the contact of the developing tooth germs may induce necrosis of the intervening tissue, thus producing a fused tooth. If the latter is the case, the enamel hypoplasia on the mesiobuccal cusp of the mandibular right third molar of our case may have been



Fig. 5. Ground section of the specimen revealed a cluster of invaginated enamel embedded in the radicular dentine of the supernumerary component of the fused tooth. ($\times 1.5$)

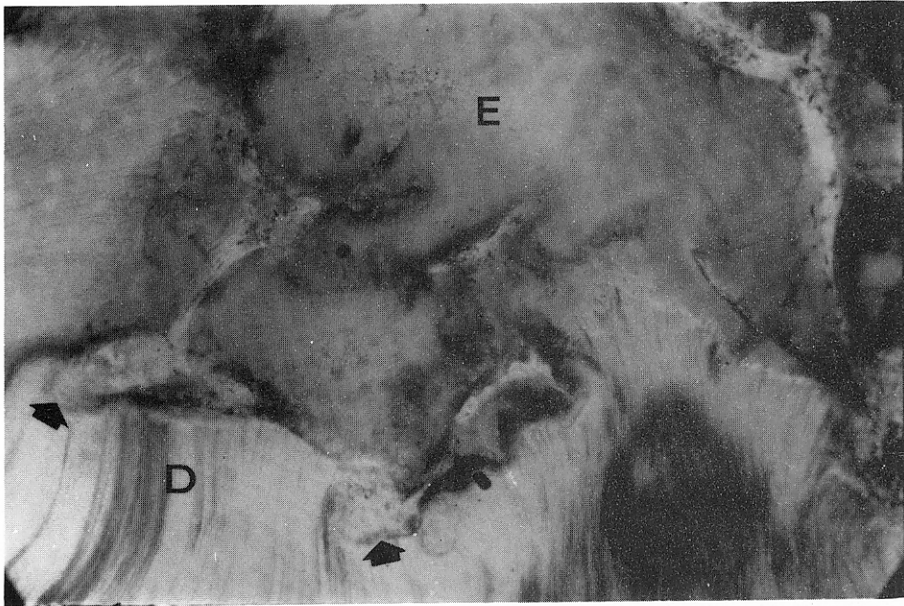


Fig. 6. Two clefts among the invaginated enamel masses extending to the dentinoenamel junction made the areas devoid of the lining enamel (arrows). Note the exaggerated scallops of the dentinoenamel junction. ($\times 50$) (E: enamel, D: dentine)

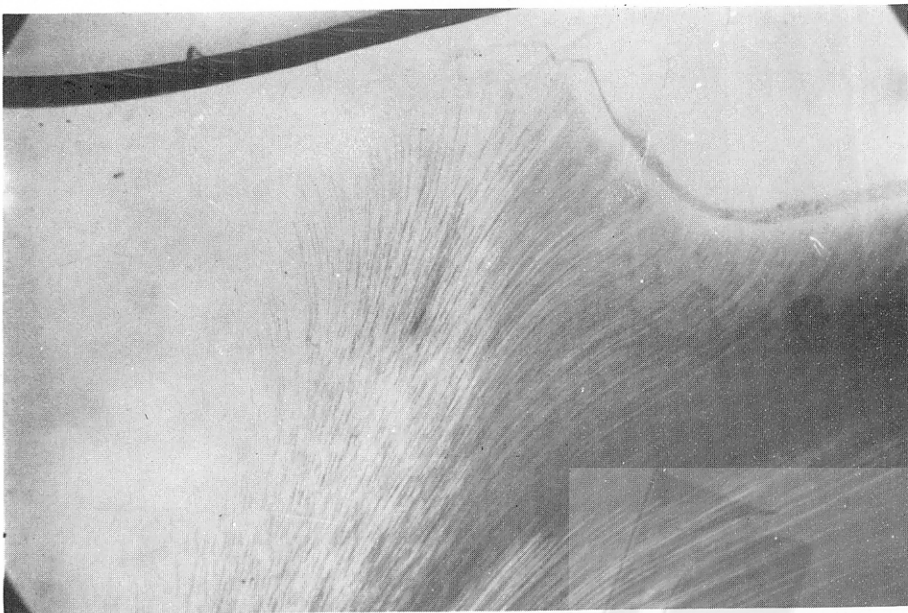


Fig. 7. Fan-like arrangement of the dentinal tubules of the prominent crest of the intercoronal area of the fused molar. ($\times 50$)

caused by the progressive necrosis of the correlative ameloblasts upon the compression of the contact enamel organs of the fusing teeth.

The location and the fan-like arrangement of the dentinal tubules of the prominent crest of the intercoronal area and the lingual surface of the fused tooth suggest this was the junctional area of two fused components. This crest may have been produced by the outgrowth of the Hertwig's root sheath after the fusion of the tooth germs. However, in the junctional area of the fused elements, most reported cases showed a well-defined depression or grooves⁽¹²⁾, not a prominent crest as in the cases of Davis⁽²⁾ and ours. The cause of these differences remains obscure.

Dens invaginatus in the molars is an extremely rare dental anomaly. Oehlers⁽¹³⁾ classified the crown forms of invaginated posterior teeth into three groups. The "Group 1" invaginated tooth has a normal or near-normal crown appearance, and an invagination may arise from the occlusal fissure or pit. In the "Group 2" invaginated tooth, the crown is diminutive and dome shaped with a deep central depression on its convex occlusal surface. The central depression leads to an invagination, which is often saccular in form and the enamel lining is irregularly involuted and pitted. The "Group 3" invaginated tooth has a distinct supernumerary element geminated to a posterior tooth, and the invagination arises from the occlusal fissure between the supernumerary element and the crown proper. In our case, the invaginated supernumerary component of the fused tooth may fulfill the criteria of group 2 invaginated tooth.

The original stimulus which causes the dens invaginatus to develop is still unknown. Recent study⁽¹⁴⁾ suggested the concept of excessive and prolonged mitotic activity of the cells in the central part of the enamel organ being the mechanism by which dens invaginatus arises. Moreover, the dilation of the invaginated cavity before the deposition of the underlying dentine may be caused by venous congestion and tissue fluid transudation^(15,16). Beynon⁽¹⁴⁾ proposed that increased pressure and distention of the enamel organ at an earlier stage may cause discontinuities within the inner enamel epithelium.

However, the exaggerated scalloping of the dentinoenamel junction in the cases of Oehlers⁽¹³⁾ (Case 11) and ours suggest that overcrowding of the ameloblasts after the recession from the deposited enamel may cause necrosis of some ameloblasts. This may result in the discontinuities on the invaginated enamel lining and the clefts among the invaginated enamel masses.

Two types of radicular invagination have been described by Oehlers⁽¹⁷⁾. The first type is an exaggerated infolding of the root which is lined by cementum. The second type revealed a saccular dilated invagination within the root which is lined by enamel, and was suggested to be a result of proliferation and ingrowth of the Hertwig's sheath into the dental papillae. For the latter, very few cases have been reported⁽¹⁷⁻²⁰⁾. Most of them revealed a small opening of the invagination on the root surface, dilated root, and compressed pulp space. This should not be confused with our case. For our case, with the invaginated supernumerary crown, the prominent crest on the junction area of the two fused components, apical foramina of the root apex of the supernumerary component and the enlarged pulp chamber in the confluent area, is considered to be a case of fusion of a third molar to an invaginated supernumerary interradicular molar.

ACKNOWLEDGMENT

We would like to thank Dr. Ching-Chang Chen for his help in the preparation of the ground section of the specimen. We are also grateful to Dr. Teh-Chang Chao for his helpful editing for this manuscript.

REFERENCES

1. Shteyer A: Fusion of a third molar with a distomolar. *Oral Surg Oral Med Oral Pathol* 42:410, 1976.
2. Davis GB, Tideman H: Completely fused third and fourth molars. *Oral Surg Oral Med Oral Pathol* 45:981, 1978.
3. Abrams RA, Nelson DL: Fusion of a third molar to a supernumerary tooth with an associated dentigerous cyst. *Austral Dent J* 24:141-142, 1979.
4. Hemmig SB: Third and fourth molar



- fusion. *Oral Surg Oral Med Oral Pathol* 48:572, 1979.
5. Fink HD, Venokur PC: Posterior fusion. *Oral Surg Oral Med Oral Pathol* 42:852, 1976.
 6. Kaffe I, Littner MM, Begleiter A, Buchner A: Fusion of permanent molars. *Quint Int* 11:1237-1239, 1982.
 7. Gersh RP, Isler S: Bilateral connation of primary molar: report of a case. *J Dent Child* 40:39-41, 1973.
 8. Schulze C: Developmental abnormalities of the teeth and jaws. In: Thoma's oral pathology. (Gorlin RJ, Goldman HM eds.), The C.V. Mosby Co., St. Louis, 6th ed.: 120-121, 1970.
 9. Spouge JD: Oral pathology. The C.V. Mosby Co., St. Louis, 135-136, 1973.
 10. Shafer WG, Hine MK, Levy BM: A textbook of oral pathology. W. B. Saunders Co., Philadelphia, 4th ed.: 38-39, 1983.
 11. Lowell RJ, Soloman AL: Fused teeth. *J Am Dent Assoc* 68:782-783, 1964.
 12. Mader CL: Fusion of teeth. *J Am Dent Assoc* 98:62-64, 1979.
 13. Oehlers FAC: Dens invaginatus (Dilated composite odontomas): II Associated posterior crown forms and pathogenesis. *Oral Surg Oral Med Oral Pathol* 10: 1302-1316, 1957.
 14. Beynon AD: Developing dens invaginatus (dens in dente). *Br Dent J* 153: 255-260, 1982.
 15. Bøhn A: Dens in dente. *Acta Odontol Scand* 8:55-80, 1948.
 16. Rushton MA: Invaginated teeth (dens in dente): contents of the invagination. *Oral Surg Oral Med Oral Pathol* 11: 1378-1387, 1958.
 17. Oehlers FAC: The radicular variety of dens invaginatus. *Oral Surg Oral Med Oral Pathol* 11:1251-1260, 1958.
 18. Rushton MA: A collection of composite odontomas. *Br Dent J* 63:65-85, 1937.
 19. Bhatt AP, Dholakia HM: Radicular variety of double dens invaginatus. *Oral Surg Oral Med Oral Pathol* 39:284-287, 1975.
 20. Soames JV, Kuyebi TA: A radicular dens invaginatus. *Br Dent J* 152:308-309, 1982.

併生三種牙齒異常之單一牙齒

陳仁杰 楊家福 林正仲 陳中和 林立民

臼齒之融合牙(fusion)，贅生根間臼齒(supernumerary interradicular molar)，和臼齒之牙中牙(dens invaginatus)是三種相當少見的牙齒異常。此三種牙齒異常併發於單一臼齒的病例則未曾被報告過。本文即報告一例此三種異常併發於一下顎臼齒之病例。患者為一21歲女性，因右側下顎智齒齶齒而求診

於高雄醫學院附設中和醫院牙科。口腔檢查發現右側下顎智齒為一近心偏向之阻生齒，其近心咬合面有明顯齶齒窩洞。X光檢查發現右側下顎智齒近心根部有一融合之根間臼齒；此根間臼齒之咬合面可見一明顯之牙中牙影像往牙根部延伸。此融合臼齒經拔除、縱切觀察證實為一下顎智齒與合牙中牙之根間臼齒的融合牙。

