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'Double' Teeth – A Diagnostic Conundrum

Abstract: A 'double' tooth is an uncommon dental developmental anomaly that can occur in the deciduous and/or permanent dentition. It is not always possible to differentiate clinically between fusion and gemination. Clinical and radiographic examination, as well as a histological assessment, can help to differentiate between fusion and gemination. A case of fusion in the deciduous dentition is presented to demonstrate the diagnostic differences but also, more importantly, to draw attention to the potential impact of 'double' teeth on the developing secondary dentition and its future management.

Clinical Relevance: The diagnosis of 'double' teeth has minimal clinical importance in the deciduous dentition. However, its presence should alert the general dental practitioner to investigate the developing secondary dentition closely and refer for specialist advice as necessary.

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Fusion and gemination are uncommon developmental disturbances that give rise to variation in crown and root morphology.¹ These specific dental anomalies more frequently affect the primary dentition but can also occur in the permanent dentition.^{2,3} No specific prevalence rates that distinguish between fusion and gemination are available in the published literature. The prevalence of 'double' teeth (a term used to describe fusion and gemination) affects less than 1% of children.³

Aetiology

Despite various hypotheses, the aetiology for these anomalies remains unclear. A hereditary association has

been reported in some cases.⁴ Currently, geminated (twinned) teeth are thought to arise from an attempt at division of a single tooth germ with resultant incomplete formation of two teeth. The teeth usually present with either completely or incompletely separated crowns that have a single root and a common root canal.^{4,5}

Fusion, on the other hand, arises as a result of union between two normally separated tooth germs. It can be classified as either complete or incomplete, depending on the developmental stage of the different tooth germs when fusion occurs.⁵ For example, a single large tooth may be the result of early fusion, whereas late fusion may give rise to 'separate' teeth with continuity of the roots only. Some researchers have used the term 'conrescence' to describe cases in which there is confluence of cementum only.⁴ The dentine, however, is confluent in cases of true fusion.^{5,6}

Diagnosis

Simply counting the number

of teeth (with the anomaly counted as a single unit) has been suggested to aid the diagnosis and enable the clinician to differentiate between fusion and gemination.⁷ A full complement of crowns indicates gemination, whereas fewer than the expected number suggests fusion. The wide variations seen in the presentation of these complete/incomplete malformations may, however, not always lend itself to this simple 'counting rule'. Case reports of fusion between supernumerary and normal tooth germs,^{8,9} or when fusion and gemination occur concurrently,¹⁰ serve as examples of this diagnostic dilemma. In some circumstances, clinical, radiographic and histological investigations are required in order to differentiate between fusion and gemination.

Case report

An 8-year old Asian boy was referred by his general dental practitioner for an orthodontic consultation. He presented in the early mixed dentition with the presenting complaint being of

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Figure 1. Frontal view of lower dentition demonstrating the 'double' tooth.



Figure 2. Occlusal view of the lower labial segment in the early mixed dentition. Note the absence of the lower right deciduous canine tooth (\bar{c}).



Figure 4. Post-extraction peri-apical radiograph of the 'double' tooth. The radiograph demonstrates the separate crowns, roots and pulp chambers of both teeth.

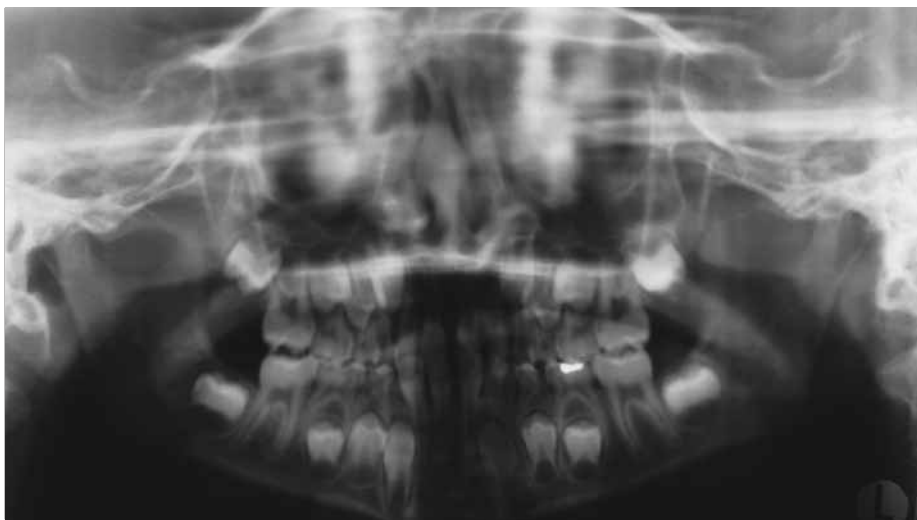


Figure 3. Orthopantomogram radiograph (OPT) demonstrating the 'double' deciduous tooth affecting the lower left quadrant. Note the presence of only three lower permanent incisors.



Figure 5. Inferior view of the extracted specimen suggesting two separate apical foramina.

'prominent upper teeth'. The patient was an active thumb sucker and his upper labial segment was proclined. Intra-oral examination revealed an immobile 'double' tooth involving the crowns of the left deciduous canine and lateral incisor teeth. The patient had previously shed his lower right deciduous canine tooth (Figures 1 and 2). An OPT radiograph was taken to assess the developing dentition (in view of only three erupted lower incisors), but also to assess the root morphology of the 'double' tooth (Figure 3).

Radiographic investigation confirmed the clinical impression. The deciduous lower left canine and lateral incisor teeth were morphologically 'joined' despite them having separate crown, root and pulp entities. The patient's lower left permanent lateral incisor (\bar{l}) was found to be developmentally missing.

Case management

After consultation, it was decided to extract the 'double' tooth (Figures 4 and 5) to allow for the spontaneous eruption of the permanent canine into a mesial but more favourable position. The absent \bar{l} introduced a tooth-size discrepancy between the upper and lower dental arches. The tooth-size difference and any morphological variance will be ultimately addressed by a combination of orthodontic appliance therapy and restorative camouflage treatment when the patient is in the early permanent dentition.

Histology

The extracted tooth was sent to the Oral Pathology department for



Figure 6. A transverse histological section (H & E stain at 40x magnification) showing confluent dentine (3) between the two pulp chambers (a and b). There is evidence of interglobular dentine (2). There are remnants of pulpal tissue (1) and a pulp stone (4) is visible in pulp chamber a.

histological examination. The transverse sections produced clearly demonstrate an area of confluent dentine between the two individual and separate pulp chambers (Figure 6).

Discussion

'Double' teeth in the deciduous dentition may cause localized crowding or spacing as a result of their aberrant morphology. Extraction of the deciduous 'double' tooth may be required to allow normal eruption of the permanent tooth. Several treatment options are available to manage 'double' teeth in the permanent dentition.

Restorative 'camouflage' through selective anatomical reshaping (with composite resin addition or crown provision) may provide a pleasing aesthetic result. Crown division has also been previously attempted but this often results in involvement of the pulp and subsequent endodontic treatment.¹⁰ Significant anatomical variation may prove difficult to manage restoratively. Buccal and palatal grooves may continue down the length of the root surface and may lead to periodontal complications. Surgical removal with prosthetic replacement may then have to be considered. This latter option needs careful planning to limit local bone loss, which may compromise future treatment options and overall aesthetics.

In this particular case, the clinical application of the 'counting-rule' suggested fewer than the expected number of teeth. The radiographic examination clearly demonstrates two separate roots with individual pulp chambers. The clinical and

radiographic examinations, as well as the histological investigation, all supported a diagnosis of 'incomplete' fusion.

Is it of clinical importance to distinguish between a diagnosis of fusion and gemination? Differentiation between fusion and gemination in the primary dentition is of limited clinical importance but it should draw a clinician's attention to the developing permanent dentition. Fusion and gemination of the permanent teeth can lead to morphological changes and a compromise in dental appearance. The practitioner should closely monitor the development of the secondary dentition, inform the patient of possible future complications and arrange timely referral to a specialist.

Conclusion

The occurrence of tooth fusion and/or gemination in the deciduous dentition is a relatively uncommon phenomenon. The general dental practitioner should, however, be aware of its possible consequences. Clinical management can be potentially complex and often requires a collaborative orthodontic-restorative treatment approach.

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Abstracts

SIDE EFFECTS OF BLEACHING?

Effect of nonvital bleaching with 10% carbamide peroxide on sealing ability of resin composite restorations. M Türkün and S Türkün. *International Endodontic Journal* 2004; **37**: 52–60.

Tooth bleaching is now an accepted part of general dentistry, and health and safety concerns have seen a move away from the traditional 30% hydrogen peroxide to a more acceptable 10% solution of carbamide peroxide. This

has been recommended for use both internally in root canal treated teeth, and externally in both vital and non-vital cases. This *in vitro* investigation sought to examine whether the use of this material had any effect on the sealing ability of resin composite restorations bonded with a self-etching adhesive system.

It was found that restorations placed immediately after the application of the bleaching agent exhibited significantly more leakage and less close marginal adaptation of the resin

composite to the cavity walls. A one week delay in restoration following bleaching improved the situation but did not reverse it entirely.

In the light of these findings, practitioners would be advised to defer the placement of any adhesive restorations for some time after the completion of a course of bleaching therapy, and to ensure that home bleaching is not being carried out unknown to the dentist.

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