

Bilateral Gemination

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CASE

A 21-year-old male patient presented to the clinic with a main complaint of altered aesthetics of his front teeth. On clinical examination the patient presented with peg-shaped maxillary lateral incisors as well as macrodontia of the maxillary central incisors (Figure 1). Upon radiological examination, the microdont peg-shaped lateral incisors (12 and 22) were evident and the 11 and 21 presented each as a single enlarged tooth with a bulbous root and bifid crown with a cavitated central groove (Figure 2). The tooth count in the patient was normal, hence a diagnosis of bilateral gemination of the crowns of the maxillary central incisors were made. The patient was referred to the restorative department for further treatment.



Figure 1

Figure 1: 12 and 22 presenting as peg-shaped lateral incisors. The 11 and 21 macrodontic maxillary central incisor teeth with a cavitated central groove.

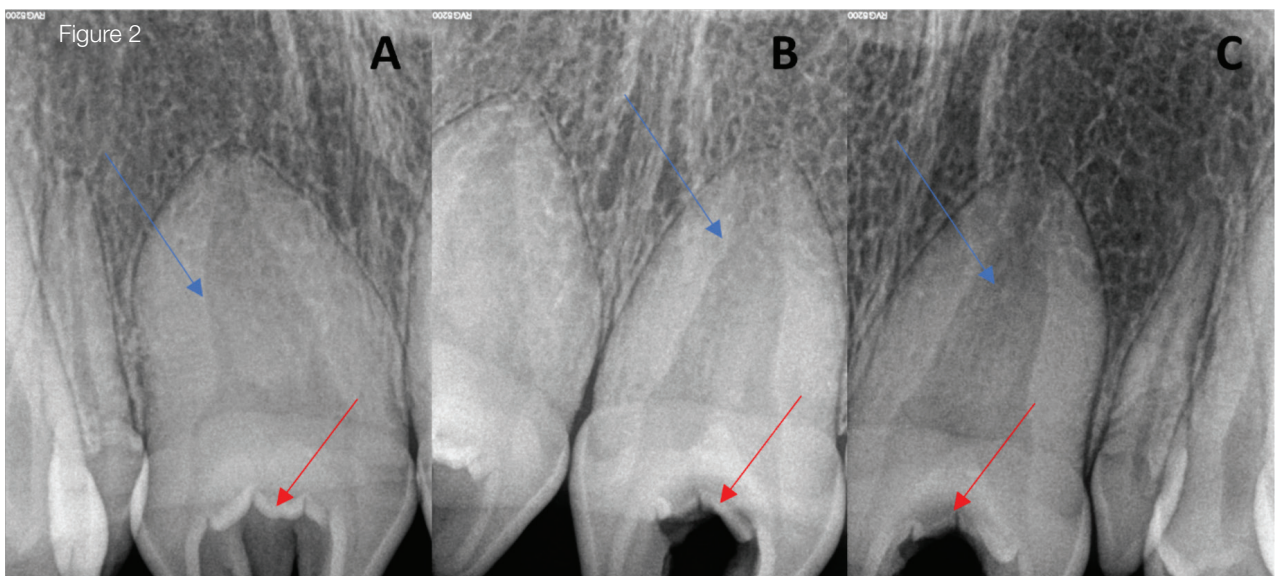


Figure 2

Figure 2A-C: Periapical radiographs presenting 12 and 22 microdont lateral incisor teeth, as well as 11 and 21 as geminated teeth with a single pulp chamber (blue arrow) and bicuspid crown (red arrow).

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INTERPRETATION

Introduction

Gemination and fusion are developmental anomalies that result in altered morphology of the teeth and are characterised by the formation of an enlarged tooth.¹ Macrodonia is defined as a dental anomaly in which one or more teeth are larger than normal and may be mistaken for fusion and/or gemination.² In the case of macrodonia, the enlarged tooth has a normal crown and root.² In contrast, gemination occurs when a single tooth bud attempts to divide, resulting in an incompletely separated tooth.¹ Fusion occurs when two separate tooth buds fuse either completely or incompletely during any developmental stage resulting in a larger tooth.¹ Distinguishing between gemination and fusion can be difficult. Marder's 'two tooth' rule is a practical approach to use for this.² If the abnormal teeth are counted as one and the number of teeth in the dental arch is less than normal, it is called fusion. If the abnormal teeth are counted as one and the number of teeth in the dental arch is normal then it is considered gemination.²

Aetiology and pathogenesis

Both gemination and fusion are more common in the primary dentition.¹ The area that is most commonly affected is the mandibular incisors.¹ The prevalence of fusion and gemination in the permanent dentition is 0.05% and is more frequently found unilateral.^{3,4} Although the aetiology of gemination is unknown¹ multiple genetic-, endocrine- and environmental factors have been proposed.⁴ Other suspected aetiological factors include trauma, hypervitaminosis-A during gestation, thalidomide embryopathy and viral infections.² Gemination and fusion can also manifest as part of a syndrome like osteopetrosis and focal dermal dysplasia.²

Clinical and radiological features

Gemination is thought to be caused by the incomplete division of a single tooth germ, that starts at the incisal edge and ends before cleavage is complete.² On clinical examination, a geminated tooth resembles a bifid crown and often radiographically, a single root and pulp space can be seen.² Bilateral gemination of teeth in the anterior maxilla is very rare¹.

Classification

Gemination can be classified according to Aguilo *et al.* as follows:⁵

- Type 1: Enlarged crown with a notch on the incisal edge, pulp chamber can be bifid, normal radicular dimension, cervical widening of canal.
- Type 2: Straight/normal incisal edge, large pulp chamber and root canals with increased radicular dimension.
- Type 3: Two fused crowns, with complete or partial vertically running groove, which extends cervically. Coronal portion may or may not be symmetrical. Pulp chamber coronally can be fused or shared, but end as two separate canals.
- Type 4: Two separate crowns with separate root and canals (Twinning).

Treatment options

Gemination is usually asymptomatic, but aesthetic concerns, caries susceptibility, periodontal destruction, impacted adjacent teeth and malocclusion may result.¹ Gemination can lead to crowding, ectopic eruption, deviation of the midline, delayed eruption of other teeth and a diastema.² This often results in challenges during treatment, necessitating a multidisciplinary approach tailored to the complexity of each individual case.⁶

Ultimately, the management of any dental anomaly is dependent on the crown, root and endodontic morphology, the type of dentition (primary, secondary, supernumerary), the orthodontic and periodontal status of the patient and the aesthetic expectations of the patient.² Functional and aesthetic concerns that can arise may require endodontic, restorative, surgical and/or orthodontic input as part of the management strategy and execution.⁴ Geminated teeth usually have large pulpal chambers and simply reducing the size is limited since you can easily perforate the pulpal chamber.² A detailed clinical and radiological examination should be done followed by photographs and study models.² In the primary dentition, treatment is only required if the geminated tooth will interfere with the eruption of the permanent dentition. Thus, extraction and sealing of the grooves is usually the only treatment required in the primary dentition.²

Conclusion

This highlights the importance of recognising dental anomalies followed by cognisance of the dentition affected, tooth morphology, cleanability, periodontal involvement, caries and orthodontic status for treatment planning.²

Authors declaration

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Ethics approval: This study was approved by the University of Pretoria Ethics Committee (Reference no.: 80/2024). All procedures followed the ethical standards of the Helsinki Declaration of 1975, as revised in 2013.

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