

Dental Gemination in a Permanent Mandibular Central Incisor: an Uncommon Dental Anomaly

Geminación Dental en un Incisivo Central Mandibular Permanente: una Anomalía Dental Infrecuente

Víctor Beltrán^{*}; Carolina Leiva^{**}; Iván Valdivia^{***}; Mario Cantín^{****} & Ramón Fuentes^{*}

BELTRÁN, V.; LEIVA, C.; VALDIVIA, I.; CANTÍN, M. & FUENTES, R. Dental gemination in a permanent mandibular central incisor: an uncommon dental anomaly. *Int. J. Odontostomat.*, 7(1):69-72, 2013.

ABSTRACT: Gemination is an anomaly in size, shape, and structure of the teeth. The primary dentition is more frequently affected, but gemination may occur in permanent dentitions, usually in the maxillary-incisal region. In geminated teeth, incomplete development of two teeth from a single bud results in a larger tooth crown with a single root and canal. In this study, a gemination case in a male patient, 13-year-old, with an ancestry of Aymara, who visited a private clinic in Antofagasta, Chile, for a routine check is presented. On intra-oral clinical examination of the coronary anatomy, the tooth 4.1 was observed with a large crown, bifurcated in the center of incisal zone. In addition, a groove extending from the bifurcation to the cemento-enamel junction was noted. Radiographic examination revealed the presence of a single root canal and a single root. The pulp cavity was separated in two cavities, in accordance with the division caused by the observed bifurcation. This report describes a unique case of dental gemination of mandibular permanent central incisor in a subject with Aymara ancestry and discusses the differential diagnosis and possible future treatment options anticipated for this particular case.

KEY WORDS: dental germination, permanent mandibular central incisor, radiographic anatomy, bifid crown.

INTRODUCTION

Gemination is an anomaly of size, shape, and structure of teeth. The primary teeth are more frequently affected, but gemination may also occur in permanent dentitions, usually in the maxillary-incisal region (Chipashvili *et al.*, 2011).

The phenomenon of gemination occurs when two teeth develop from one single germ, with incomplete division (Guimarães Cabral *et al.*, 2008; Guttal *et al.*, 2010). In addition, the fusion of a normal tooth and supernumerary germ is also considered gemination. Anatomically, a larger crown that has a single root and single canal can be observed in a geminated tooth. Often, a furrow with variable depths on the crown, which may continue onto the root surface, is noted, indicating the apparent adhesion line between both the germs (Hernandez-Guisado *et*

al., 2002). The patient may present a normal number of teeth or an associated hypodontia (Nadal-Valldaura, 1993).

Gemination is an unusual developmental anomaly of the hard dental tissue, with a reported prevalence of primary and permanent dentitions being 0.5 and 0.1%, respectively (Guttal *et al.*; Hernandez-Guisado *et al.*; Nadal-Valldaura). Evidences presented in the literature are controversial regarding the establishment of differential diagnosis for teeth fusion and gemination. For this purpose, the dentist must carry out a highly judicious radiographic and physical examination (Rajashekhara *et al.*, 2010). This report describes a unique case of dental gemination of mandibular permanent central incisor in a subject with Aymara ancestry.

* Department of Integral Adult Dentistry, Faculty of Dentistry, Universidad de La Frontera, Temuco, Chile.

** Specialist in Endodontics, Private practice, Antofagasta, Chile.

*** Department of Human Anatomy, Faculty of Health Sciences, Universidad de Antofagasta, Antofagasta, Chile.

**** Doctoral Program in Morphological Science, Faculty of Medicine, Universidad de La Frontera, Temuco, Chile.

CASE REPORT

We present a case of a male patient, 13-year-old with an ancestry of Aymara (Indians in the mountains of Northern of Chile), who visited a private clinic in Antofagasta, Chile, for a routine check. In the intra-oral clinical examination of the coronary anatomy, the tooth 4.1 was observed with a large crown, bifurcated in the center of the incisal area. In addition, a groove extending from the bifurcation to the cemento-enamel junction was noted (Fig. 1). Radiographic examination revealed the presence of a single root canal and a single root. The pulp cavity was separated in two cavities, in accordance with the division caused by the observed bifurcation (Fig. 2).

No other anomalies were found and no further information obtained from familial and medical histories was related to the case.



Fig. 1. Tooth 4.1 with a symmetric division of crown caused by incomplete bifurcation on incisal zone. Due to large size of crown, it is observe dental rotation and crowding. In addition, the gingival anatomy is altered.



Fig. 2. Radiography shows a large pulp camera, with a two pronounced horns in relation to crown bifurcation and a single root canal and a single root. The evidence indicates that is a gemination.

DISCUSSION

The terminology dental fusion and germination are used to define two different morphological dental anomalies, characterized by the formation of a clinically wide tooth. Fusion and germination are developmental anomalies with difficulties both in morpho-differentiation and clinical differential diagnosis (Rajashekhara *et al.*). To resolve the diagnostic difficulties between fusion and germination, Brook & Winter (1970) suggested referring these anomalies in a neutral term, such as "double teeth." However, these two entities should be recognized as independent. The phenomenon of germination occurs when two teeth develop from one single tooth germ and results in a larger tooth crown that radiographically has a single root and single canal, while fusion is a union of two separately developing tooth germs typically leading to one less tooth than normal in the affected arch and radiographically two root canals and two roots.

In our case, on clinical examination, we observed four permanent mandibular incisors, including the tooth 4.1 with double aspect. In addition, radiographic evaluation showed a clear, although incomplete, pulp crown division in two symmetrical portions over a single root canal and a single root. Thus, we concluded that the patient is suffering from gemination. For this case, diagnosis is apparently uncomplicated. Hernandez-Guisado *et al.* presented a gemination case of lower third molar, semi-retained, which was apparently bonded to supernumerary molar, sharing the crown, pulp chamber, and canal. This diagnosis can be discussed in terms of dental fusion due to the difficulty in trying to differentiate between the origin of two teeth from a single germ and the fusion of a normal and supernumerary germ. In some cases, it is difficult to establish a differential diagnosis between fused teeth and geminated teeth, particularly when they are associated with supernumerary teeth (Le Gall *et al.*, 2011). Accordingly, our case corresponded to similar finding. Nevertheless, the low prevalence of supernumeraries in incisal mandibular zone (Alves *et al.*, 2011) and the anatomical symmetric aspect of the tooth described confirm our diagnosis. It has been suggested that in gemination the two halves of the joined crowns are usually mirror images, as in our case, in contrast to fusion, which manifests with a distinct difference in the two halves of the crown (Hattab & Hazza'a, 2001).

The etiology of geminated teeth remains unknown. Literature suggests that the condition may result from trauma to the developing tooth bud. Evidence from case history studies suggests that the anomaly exhibits a hereditary tendency, like other anomalies (Alves *et al.*, 2012), similar to that affecting the dental lamina and resulting in hyperdontia. The mode of inheritance is probably either autosomal recessive or dominant with very little penetrance. It appears that gemination is caused by complex interactions among a variety of genetic and environmental factors (Hattab & Hazza'a). Irrespective of their origin, dental gemination anomalies often give rise to a number of clinical problems.

Most of the reported cases in the literature are from the Indian population. Guttal *et al.* reported a 0.5 and 0.1% prevalence of deciduous and permanent dentitions, respectively, among a total of 20.182 patients. Presentation of this alteration can be variable. For example, Kottoor *et al.*, (2012), reported a case of a maxillary lateral incisor with four root canals, whose differential diagnosis included fusion, gemination, dens invaginatus, or a combination of these. With respect to the type of the affected teeth in permanent dentition, a rare report of an unerupted mandibular canine in an 8-year-old patient had been presented, who had the same condition in the canine deciduous (Alves *et al.*, 2010), maxillary second molar (Weinstein *et al.*, 2010), maxillary central incisors (Türkcaslan *et al.*, 2007), and mandibular lateral incisor (Flores *et al.*, 2009). Central mandibular incisor geminated, as shown in this report, have not been found in the literature.

In the anterior region, this anomaly can cause unpleasant esthetic appearance due to irregular morphology. If a deep groove is present, these teeth may be susceptible to caries and periodontal disease and may require endodontic intervention in some cases which may be complicated (Türkcaslan *et al.*, 2007).

The main periodontal complication in gemination cases, as in our report, occurs due to the presence of fissures or grooves in the union between the teeth involved. If these defects are very deep and extend subgingivally; the possibility of bacterial plaque accumulation in this area is quite high. Strict oral hygiene is imperative to maintain periodontal health.

Furthermore, it is important to consider that this malformation often causes teeth malposition, which affects dental hygiene and esthetics of the patients. Clinicians should have a broad knowledge regarding developmental anomalies, their variations and the clinical consequences.

In conclusion, case history and clinical and radiographic examinations can provide the information required for the diagnosis of dental abnormalities. A multidisciplinary approach with different practitioners with expertise in several areas of dentistry is important to achieve functional and esthetic success to treat these rare cases. The therapy for this anomaly may include endodontic treatment, redesign of crown by prosthetic tooth, and orthodontic treatment (Flores *et al.*; Weinstein *et al.*). Therefore, it is important to know the morphology, frequency, and prognosis of the geminated teeth.

BELTRÁN, V.; LEIVA, C.; VALDIVIA, I.; CANTÍN, M. & FUENTES, R. Geminación dental en un incisivo central mandibular permanente: una anomalía dental infrecuente. *Int. J. Odontostomat.*, 7(1):69-72, 2013.

RESUMEN: La geminación es una anomalía que afecta el tamaño, forma y estructura del diente. La dentición temporal es afectada con más frecuencia, pero puede ocurrir en la dentición permanente, generalmente en la región maxilar incisal. En los dientes geminados, el desarrollo incompleto de dos dientes desde un solo brote dentario resulta en una corona dentaria más grande, con una sola raíz y canal. En este artículo, se presenta un caso de geminación en un paciente de sexo masculino, de 13 años de edad con ascendencia Aymara observada durante un control de rutina. Al examen clínico intraoral, el diente 41 se observó con una gran corona, bifurcado en el centro de la zona incisal, junto a un surco que se extendió desde la bifurcación hasta la unión amelo-cementaria. El examen radiográfico reveló la presencia de una sola raíz y un canal único. La cavidad pulpar se separó en dos, según la división causada por la bifurcación coronaria. Este reporte muestra un caso infrecuente de geminación dental del incisivo central mandibular permanente en un sujeto de ascendencia Aymara, y se discute su diagnóstico diferencial y las opciones de tratamiento futuras previstas para este caso en particular.

PALABRAS CLAVE: germinación dental, incisivo central mandibular permanente, anatomía radiográfica, corona bífida.

REFERENCES

- Alves, N.; De Oliveira Nascimento, C. M. & Patriarca, J. J. Dental gemination in the inferior canine in both dentition. Case report. *Int. J. Morphol.*, 28(3):873-4, 2010.
- Alves, N.; De Oliveira Nascimento, C. M. & Olave, E. Clinical and morphological aspects of the supernumerary teeth. *Int. J. Morphol.*, 29(3):1040-6, 2011.
- Alves, N.; Oliveira, R. J. & Deana, N. F. Displasia ectodérmica hipohidrótica - un síndrome de interés para la odontología. *Int. J. Odontostomat.*, 6(1):45-50, 2012.
- Brook, A. H. & Winter, G. B. Double teeth. A retrospective study of 'geminated' and 'fused' teeth in children. *Br. Dent. J.*, 129(3):123-30, 1970.
- Chipashvili, N.; Vadachkoria, D. & Beshkenadze, E. Gemination or fusion? - challenge for dental practitioners (case study). *Georgian Med. News*, (194):28-33, 2011.
- Hattab, F. N. & Hazza'a, A. M. An unusual case of talon cusp on geminated tooth. *J. Can. Dent. Assoc.*, 67(5):263-6, 2001.
- Flores, J.; Fortich, R.; Cabello, A. & Morales, E. Manejo endodóntico de incisivos mandibulares con geminación. *Duazary*, 6(2):155-8, 2009.
- Guimarães Cabral, L. A.; Firoozmand, L. M. & Dias Almeida, J. Double teeth in primary dentition: report of two clinical cases. *Med. Oral Patol. Oral Cir. Bucal*, 13(1):E77-80, 2008.
- Guttal, K. S.; Naikmasur, V. G.; Bhargava, P. & Bathi, R. J. Frequency of developmental dental anomalies in the Indian population. *Eur. J. Dent.*, 4(3):263-9, 2010.
- Hernandez-Guisado, J. M.; Torres-Lagares, D.; Infante-Cossio, P. & Gutierrez-Perez, J. L. Dental gemination: report of case. *Med. Oral*, 7(3):231-6, 2002.
- Kotloor, J.; Murugesan, R. & Albuquerque, D. V. A maxillary lateral incisor with four root canals. *Int. Endod. J.*, 45(4):393-7, 2012.
- Le Gall, M.; Philip, C. & Aboudharam, G. Orthodontic treatment of bilateral geminated maxillary permanent incisors. *Am. J. Orthod. Dentofacial Orthop.*, 139(5):698-703, 2011.
- Nadal-Valldaura, A. *Patología dentaria*. Barcelona, Rondas, 1993.
- Rajashekhara, B. S.; Dave, B.; Manjunatha, B. S.; Poonacha, K. S. & Sujana, S. Bilateral fusion of primary mandibular lateral incisors and canines: A report of a rare case. *Rev. Odont. Ciênc.*, 25(4):427-9, 2010.
- Türkcaslan, S.; Gökçe, H. S. & Dalkız, M. Esthetic rehabilitation of bilateral geminated teeth: a case report. *Eur. J. Dent.*, 1(3):188-91, 2007.
- Weinstein, T.; Rosano, G.; Del Fabbro, M. & Taschieri, S. Endodontic treatment of a geminated maxillary second molar using an endoscope as magnification device. *Int. Endod. J.*, 43(5):443-50, 2010.

Correspondence to:
Victor Beltrán
Faculty of Dentistry
Department of Integral Adult Dentistry
Universidad de La Frontera
Manuel Montt 112, Temuco
CHILE

Email: bbeltran@ufro.cl

Received: 24-05-2012
Accepted: 19-11-2012