Macrodontia associated with growth-hormone therapy: a case report and review of the literature



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Abstract

Background Macrodontia is a rare dental anomaly, and isolated macrodontia is even more infrequent. The aim of this article is to report on a young male patient with macrodontia of the mandibular premolars.

Case report We herein present a case report of a young male patient receiving pharmacological growth hormone therapy for 10 years, who was diagnosed with macrodontia of the mandibular premolars. The patient underwent surgical treatment at the School of Dentistry of the University of Buenos Aires and was followed-up for more than 3 years.

Conclusion Macrodontia is a rare condition. Early diagnosis and treatment of this anomaly favors adequate formation of the dental arches. In the light of this case report, a review of paediatric patients who received growth hormone therapy during the tooth formation stage would seem relevant.

KEYWORD Dental anomalies, Macrodontia, Megalodontia, Molarization.

Introduction

Macrodontia, also known as megalodontia is a developmental dental anomaly causing the teeth to be larger than average size. It can affect a single tooth or all maxillary and mandibular teeth, in which case it is termed generalised macrodontia [Dugmore, 2001]. The reported prevalence in permanent teeth ranges from 0.03 to 1.9% [Canoglu et al., 2012], and mostly affects incisors and canines [Dugmore, 2001]. Macrodontia of premolars, often termed molarisation, is an extremely rare condition [Acharya et al., 2015]. It has no sex predilection, and the male to female ratio is 1:1. It mostly affects individuals aged 8 to 13 years [Canoglu et al., 2011]. Since macrodontia is an asymptomatic pathology, it is usually diagnosed following radiographic studies performed to investigate the cause of lack of eruption of a permanent tooth. Macrodontia has been reported in both erupted [Pace et al., 2013] and impacted [Okuno and Tanaka, 2017] teeth. Although its aetiopathogenesis remains unclear, genetic and acquired factors may play a role in the onset of this anomaly [Küchler et al., 2008; Acharya et al., 2015]. Medical conditions such as insulin-resistant diabetes, otodental syndrome, hemifacial hyperplasia, and hypophyseal gigantism have been associated with generalised macrodontia [Dugmore, 2001; Acharya et al., 2015]. Unlike the latter, there are no reports in the literature associating localised macrodontia with systemic conditions. Depending on the size and morphology of the affected teeth, macrodontia can cause functional and/or aesthetic problems, so that early treatment and diagnosis are essential to allow adequate formation of the dental arches [Okuno and Tanaka, 2017].

The aim of this article is to report on a young male patient with macrodontia of the mandibular premolars.

Case report

A 10-year-old male patient presented for consultation at the Oral and maxillofacial Surgery and Traumatology Department II of the School of Dentistry of the University of Buenos Aires (Argentina), due to lack of eruption of his permanent mandibular second premolars. Intra-oral examination showed bilateral swelling at the level of the vestibular bone plate in the mandibular premolar region, and the permanence of teeth 7.5 and 8.5 (Fig. 1). Radiographic and cone beam tomography revealed the presence of impacted mandibular second premolars exhibiting macrodontia in a crown-root direction (Fig. 2, 3). In an attempt to determine the possible aetiology of the observed macrodontia, a thorough analysis of the patient's clinical history was performed, confirming that the patient had been started on growth-hormone therapy (Norditropin Nordiflex 10mg/ml - Somatotropin) at the age of 3 years and had continued on this treatment for more than 10 years, to compensate for hypophyseal deficiency. Under local anesthesia out-patient-surgery was performed to remove both impacted teeth 4.5 and 3.5, keeping the deciduous teeth in place in order to maintain the space in the dental arch for future rehabilitation (Fig. 4, 5, 6).



FIG. 1 Intra-oral examination revealing persistence of teeth 7.5 and 8.5.

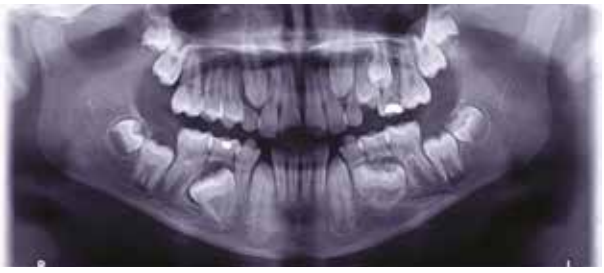


FIG. 2 Radiographic study: Coronal and root macrodontia of impacted teeth 3.5 and 4.5.

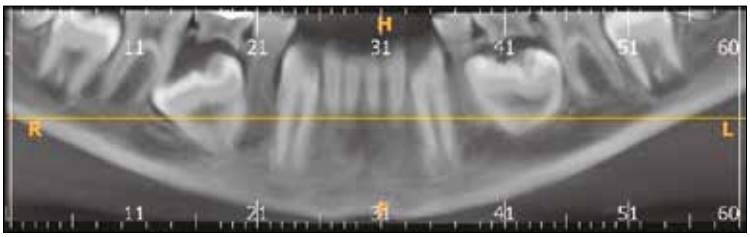


FIG. 3 Cone beam computed tomography (CBCT). The size of the crown of the premolars exhibiting macrodontia is larger than that of the molars in the dental arch.



FIG. 4 Odontosection of tooth 4.5.

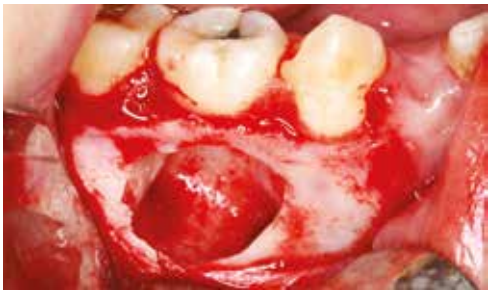


FIG. 5 Extraction of tooth 4.5, maintaining the deciduous tooth.



FIG. 6 Long term radiographic follow-up after 3 years.

Discussion

Dental anomalies are caused by complex multifactorial interactions involving genetic and environmental factors that occur during the tooth development process [Acharya et al., 2015]. Macrodontia, especially isolated macrodontia, is a rare anomaly [Canoglu et al., 2012]. Only 36 cases of macrodont premolars have been reported [Primack, 1967; Hermel et al., 1968; Lunt, 1976; Reichart et al., 1977; Peck et al., 1983; Groper, 1987; Chase, 1994; Canut and Arias, 1999; Rootkin-Gray and Sheehy, 2001; Dugmore, 2001; Dadpe et al., 2010; Fuentes and Borie, 2011; Canoglu et al., 2011; Kyriazidou et al., 2013; Pace et al., 2013; Acharya et al., 2015; Okuno and Tanaka, 2017]. Molarisation of the second premolars is usually bilateral, and only two cases of macrodontia of a single premolar have been reported in the literature [Reichart et al., 1977; Groper, 1987]. Unlike generalised macrodontia, isolated macrodontia has not been associated with syndromes and pathologies [Pace et al., 2017]. In the case report presented here, the patient had received hormonal replacement therapy with somatotropin for more than ten years. This growth-hormone stimulates cell reproduction and regeneration. The cases of macrodontia of a single premolar reported in the literature were not associated with pharmacological growth-hormone therapy in a nonsyndromic patient. This is the first case report showing a possible relationship between molarisation of a premolar and growth-hormone therapy. Isolated macrodontia can occur both in impacted [Primack, 1967; Reichart et al., 1977; Peck et al., 1983; Groper, 1987; Rootkin-Gray and Sheehy, 2001; Canoglu et al., 2001; Kyriazidou et al., 2013; Acharya et al., 2015; Okuno and Tanaka, 2017] and erupted teeth [Hermel et al., 1968; Lunt, 1976; Chase, 1994; Canut and Arias, 1999; Dugmore, 2001; Dadpe et al., 2010; Fuentes and Borie, 2011; Pace et al., 2013; Acharya et al., 2015].

There is no consensus regarding the size of macrodont teeth, mainly due to differences in the measurement methods employed. The latter include simple radiographs [Primack, 1967; Groper, 1987; Dadpe et al., 2010]; measurements made on plaster casts [Hermel et al., 1968; Lunt, 1976]; direct measurement of erupted or extracted macrodont teeth [Acharya et al., 2015; Okuno and Tanaka, 2017]; and, more recently, computed cone beam tomography [Canoglu et al., 2012]. In the case shown here, the size of the macrodont premolars was 51% larger than the mean size reported for the same teeth, considering that the mesiodistal size of a mandibular second premolar is 7.3 mm. Dental anomalies require an interdisciplinary treatment approach. Careful consideration must be given to whether the macrodont tooth can be maintained in the dental arch despite its disproportionate size and altered anatomy. The combination of surgery and orthodontics is the most frequent treatment of choice [Groper, 1987; Rootkin-Gray and Sheehy, 2001; Dugmore, 2001; Canoglu et al., 2012; Kyriazidou et al., 2013; Pace et al., 2013].

Conclusion

Macrodontia is an extremely rare condition [Dugmore, 2001]. It would seem relevant to conduct a review of paediatric patients who received growth hormone therapy during the tooth formation stage. Early diagnosis and treatment of this anomaly favors adequate formation of the dental arches.

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References

» Acharya S, Kumar Mandal P, Ghosh C. Bilateral molariform mandibular second premolars. Case Rep Dent 2015;2015:809463.
» Canoglu E, Canoglu H, Aktas A, Cehreli ZC. Isolated bilateral macrodontia of mandibular second premolars: A case report. Eur J Dent 2012;6:330-334.
» Canut JA, Arias S. Molarization of the lower second premolars. Angle Orthod 1999;69:380-381.
» Chase RH. Unusual macrodontia. Gen Dent 1994;42:216.
» Dadpe MV, Kale YJ, Patil PS. Molarization of the mandibular second premolars with concurrent dentin dysplasia: a rare case report. Int J Contemp Dent 2010;1:66-69.
» Dugmore CR. Bilateral macrodontia of mandibular second premolars: a case report. Int J Paediatr Dent 2001;11:69-73.
» Fuentes R, Borie E. Bilateral macrodontia of mandibular second premolars: a case report. J MorpholSci 2011;28:212-215.
» Groper JN. Macrodontia of a single tooth: review of literature and report of case. J Am DentAssoc 1987;114:69.
» Hermel J, Yardeni J, Haas N. Bilateral "molarization" of teeth erupted in the region of the second mandibular premolars. Am J PhysAnthropol 1968;28:345-350.
» Kyriazidou A, Haider D, Mason C, Parekh S, Bloch-Zupan A. Case report: Macrodont mandibular second premolars, a hereditary dental anomaly. Eur Arch Paediatr Dent 2013 Dec;14(6):411-6.
» Küchler EC, Risso PA, Costa Mde C, Modesto A, Vieira AR. Studies of dental anomalies in a large group of school children. Archives Oral Biology 2008 October; 53(10):941-946.
» Lunt DA. Molarization of the mandibular second premolars. J Dentistry 1976;4:83-86.
» Okuno A, Tanaka M. Isolated bilateral macrodontia of the mandibular second premolars with familial multiple supernumerary teeth: A case report. Pediatric Dental J 2017;27:105-108.
» Pace A, Sandler PJ, Murray A. Macrodont management. Dent Update 2013;40:18-26.
» Peck S, Peck H, Phaneuf RA. Megadontism anomaly of the mandibular second premolars. Oral Surg Oral Med Oral Pathol 1983;55:543.
» Primack JE. Individual bilateral megadontism: report of case. J Am Dent Assoc 1967;75:655-657.
» Reichart PA, Westergaard J, Jensen KA. Macrodontia of a mandibular premolar. Oral Surg Oral Med Oral Pathol 1977;44:606-609.
» Rootkin-Gray VF, Sheehy EC. Macrodontia of a mandibular second premolar: a case report. ASDC J DentChild 2001;68:347-349.