Molarization and Development of Multiple Supernumerary Teeth in the Premolar Region

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ABSTRACT

This case is the radiological diagnosis of a supernumerary premolar with the molarization of both lower second premolars in a 12-year-old child. Ten years after the diagnosis, the delayed development of another 4 supernumerary premolars was detected. Orthopantomography during mixed dentition allowed the detection of anomalies not clinically suspected. Any alteration in the number of teeth should suggest the potential of associated dental anomalies, indicating the long-term clinical and radiological follow-up of the patient during the second decade of life. (*J Dent Child*. 2004;71:171-174)

KEYWORDS: CLINICAL FOLLOW-UP, DELAYED DEVELOPMENT, HYPERODONTIA, MACRODONTIA, MOLARIZATION, ORTHOPANTOMOGRAPHY, PREMOLAR, SPACE MANAGEMENT, SUPERNUMERARY PREMOLARS

Dental organogenesis disorders manifest as alterations in the number, size, or form of teeth. Hyperdontia, or the presence of supernumerary teeth, affects the permanent dentition of 1% to 4% of the population.[1] Multiple supernumerary teeth are uncommon (1% of cases of hyperdontia) unless in association with diseases in which they are usual (cleidocranial dysplasia) or frequent (Gardner's syndrome, cleft lip and palate).[1-5] Excessive teeth are only designated as premolars in 8% to 9% of cases.[6] The prevalence of supernumerary premolars varies widely, ranging from 0.09% to 0.64% of the population.[7]

Only marked alterations in the size and form of teeth that have adverse consequences for tooth development and occlusion are regarded as anomalies.[8] An abnormally increased size of permanent teeth (macrodontia) has been observed in 1% to 2% of children of different origins.[9] Macrodontic second premolars are a clinical rarity, with only 8 cases described.[8-10] In all of these reports, the increase in size was accompanied by a molariform occlusal morphology, prompting the proposal that the molarization of second premolars may represent an independent clinical entity with respect to isolated macrodontia.[10] Molarization of second molars is morphologically characterized by the presence of 3 vestibular cusps,[8] although it has also been defined as an alteration of the cusp/fossa relationship of variable magnitude.[11]

The authors present a case of molarization of lower second molars associated with the development, detected after 10 years, of multiple supernumerary premolars, mostly of highly delayed calcification. The authors discuss the possible relationship between these 2 disorders and the clinical issues related to their diagnosis and treatment.

CASE REPORT

A 12-year-old boy was first referred to the authors' pediatric dental clinic in 1991 for orthodontic assessment. Although the clinical examination detected no anomaly, an orthopantomogram revealed a supernumerary premolar in the mandible, in distoangular position, located apically to the second primary molar and occlusal to the second premolar on the right side, with normal crown morphology (Figure 1). The radiographic image of both mandibular second premolars, whose development was normal for the boy's age, showed a much larger crown than normal, as well as an unusual morphology in which several cusp formations could be distinguished (Figures 2 and 3).

The mandibular right primary molar was extracted under local anesthetic to allow the spontaneous eruption of the supernumerary tooth. The extraction was successfully performed,

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and the corresponding space was maintained with a spring coil to avoid mesialization of the first permanent molar, which could interfere with the eruption of the supernumerary tooth.

After a 6-month waiting period, surgical extraction of the supernumerary tooth was performed, which was then in submucosal localization (Figure 4), and the orthodontic treatment of the patient was started. Despite the large mesiodistal size of the crown of both mandibular second premolars, they erupted normally and it was possible to align them acceptably in the arch. The orthodontic treatment was successfully completed on schedule.

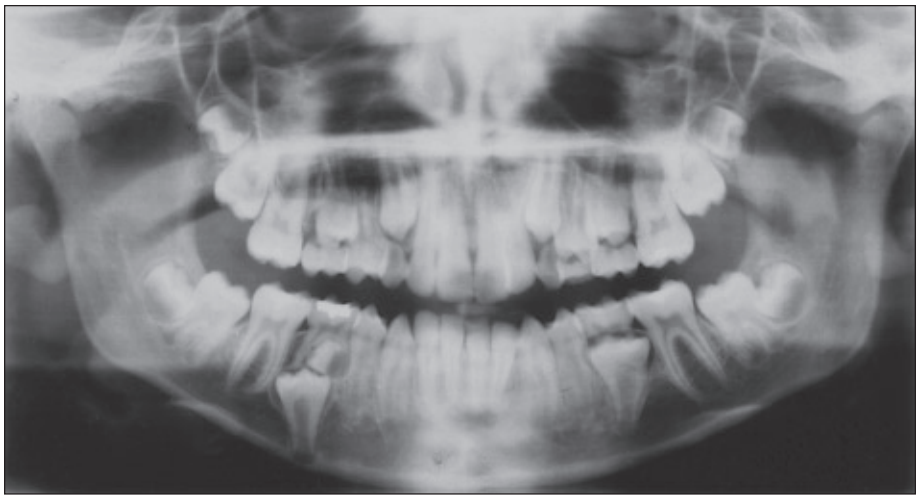

Figure 1. Orthopantomograph of the patient at 12 years old.

Ten years after the first visit, the patient, now 21, returned to the clinic reporting a swelling on the lingual surface of the mandible, in the lower left quadrant at the level of the mandibular premolars. An orthopantomograph (Figure 5) showed that the lower left swelling was due to a supernumerary premolar localized lingually to tooth 35. The orthopantomogram also revealed 3 additional supernumerary premolars: 1 in the maxilla, 1 in palatal position with respect to the upper right first premolar (tooth 14), and 2 in the lower right quadrant positioned lingually to teeth 44 and 45. All 4 presented an advanced state of root development and normal crown morphology.

It was decided to extract the lower left supernumerary premolar but postpone extraction of the remaining supernumerary premolars. Although the patient was given an appointment for clinical and radiological examination at 6 months after the extraction, he failed to return to the authors' clinic.

Figure 2. Detail of same orthopantomograph showing lower right quadrant. Observe the supernumerary tooth and the second premolar of large size and altered occlusal morphology.

DISCUSSION

The authors' patient presented 2 very uncommon dental anomalies:

1. macrodontia of second premolars, a morphodifferentiation disorder;
2. delayed and progressive development of multiple supernumerary premolars, classified as a dental initiation or proliferation anomaly.[1]

The etiology of these disorders has not been definitively established. Isolated supernumerary teeth have a clear genetic influence, shown by high prevalence in certain families and concordance in identical twins.[14] Lineage studies support a dominant or x-linked transmission, which would explain the higher prevalence in males.[2] However, most of the cases reported, including the present case, are sporadic, and the Mendelian inheritance model does not fit the data.[2] The same is true for cases of isolated macrodontia in which, as in the present case, there is no family history of the condition.[8-10] The combined presence of 5 supernumerary premolars and molarization of lower second premolars may have been coincidental in the authors' patient. However, alterations in the number, size, and form of teeth tend to be associated in the same patients.[15-17] Brook[12] claimed that alterations in the number and size of teeth are produced by the cumulative effect of genetic and environmental factors, while the local microenvironment may be responsible for the different prevalence of these disorders in distinct dental localizations. It has been proposed that premolar molarization may represent an intermediate step between fusion and supernumerary premolars.[11]

The most likely cause of the appearance of supernumerary teeth is hyperactivity of the dental lamina.[6,18,20] This possibility is supported by findings that multiple supernumeraries present different stages of development.[19,21] There have also been reports, similar to the present case, of the delayed appearance of one or more supernumerary premolars in patients who had undergone extraction of other supernumeraries at a younger age.[2,5,18,22]

From a clinical standpoint, the early detection of these disorders is essential to prevent the onset of complications.

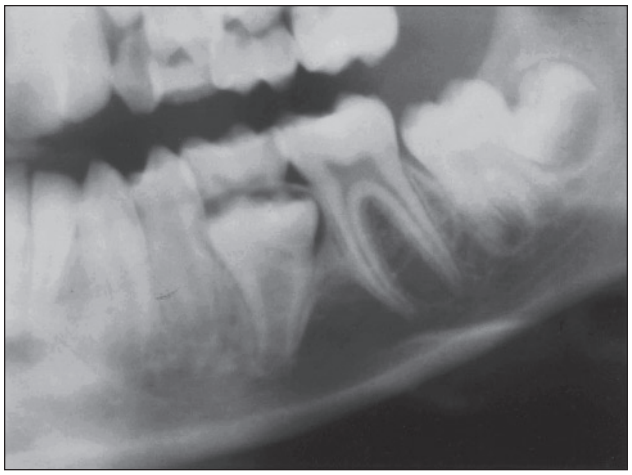

Figure 3. Detail of same orthopantomograph showing lower left quadrant. Observe nonerupted second premolar of large size and altered occlusal morphology.

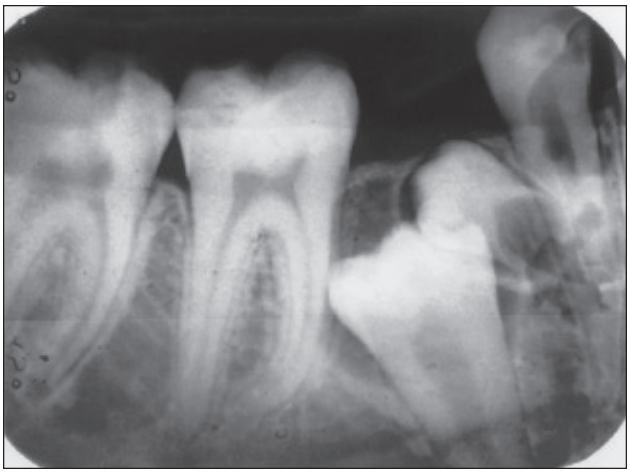

Figure 4. Periapical radiograph of the mid-apical area of the lower right quadrant, 6 months after the extraction of tooth 85. The supernumerary tooth remained submucosal, indicating its surgical removal.

However, because of their clinically unapparent development, an orthopantomograph during the mixed dentition is indispensable.

Thus, almost all published cases of isolated macrodontia of second premolars were radiographically diagnosed during the mixed dentition stage and between the ages of 8 and 14 years.[8-10]

Unlike other supernumerary teeth, premolars are usually clinically silent and present a supplementary character (ie, a normal morphology).[22] They are almost always formed lingually with respect to the normal series and can pass undetected in routine bite-wing radiography studies during mixed dentition.[23] Although their spontaneous eruption is possible, 75% of cases remain unerupted and are chance findings.[2,7,19] The age at diagnosis is very variable, because the formation of supernumeraries is usually delayed with respect to normal series. There have been occasional reports of an extreme delay of between 7 and 11 years[7,17,24] and of their progressive development over time.[2,5,22,25] As in the authors' patient, their formation is more frequent in the mandible than in the maxilla.[2,7,20,22,23] Cystic formation (9%) and lesions from impaction with neighboring teeth (13%) are the most common complications.[20] Associated risks related to orthodontic treatment include the delayed or impossible closure of the space, interference with the root torque, and reabsorption of the roots of adjacent teeth.[6]

Clinical problems related to the presence of macrodontic premolars derive from the impossibility of eruption, due to their large size or position, and the negative effects on occlusal development or stability.[8] If they erupt, they are highly susceptible to caries, because of their malposition and intricate occlusal morphology.[10]

To avoid the risk of such complications, extraction is the usual approach to macrodontic or supernumerary premolars.[8,10,22] However, the present case underlines the need for careful individual evaluation, taking account of the spatial conditions of the arches, the potential risks derived from the presence and position of the supernumeraries, and the risks associated with surgery, in particular the possible damage to adjacent structures.[25] In this patient, the authors decided to extract the supernumerary premolar detected at 12 years once it was in a submucosal localization, given that it did not emerge after extraction of the primary tooth.

Ten years later, the authors' approach to the supernumerary premolars of delayed development was to extract the symptomatic supernumerary immediately and postpone extraction

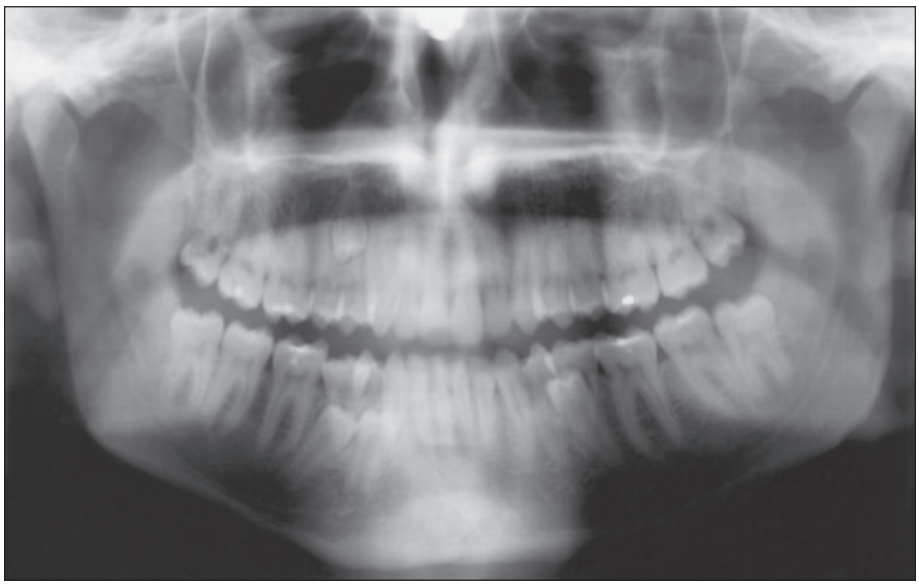

Figure 5. Orthopantomograph of the patient at 21 years old. Observe 4 nonerupted supernumerary premolars: 1 in the first quadrant, 1 in the third quadrant, and 2 in the fourth quadrant.

of the rest. Deferment was indicated because of the normal progress of eruption and the absence of complications. In these cases, regular radiographic examinations are mandatory.[3,20,22] When a supernumerary tooth is diagnosed, the long-term possibility of the progressive and delayed appearance of further supernumeraries should be considered.[22,25] However, because these cases are uncommon, no guidelines for follow-up radiography have been developed. An appropriate time to carry out an orthopantomography may be between the age of 16 and 18 years, coinciding with the examination of the third molars.[5,6,22]

CONCLUSIONS

1. An orthopantomograph during mixed dentition permits detection of anomalies not clinically suspected, allowing correct management of the space and reduction of complications and possible dental losses.
2. The presence of a numerical disorder in the dentition should raise suspicion of the possible presence of associated dental anomalies. The detection of an uncommon alteration, such as a supernumerary premolar, should alert clinicians to the possible formation of further supernumerary teeth during the second decade of life.
3. Although the treatment of these disorders culminates in the extraction of the malformed teeth, the individualized assessment of each case is mandatory.

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