Molarization of the lower second premolars

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Abstract: This paper presents a case of extreme tooth variation. The patient was first observed during the mixed dentition period, when she presented a mild Class II malocclusion with increased overjet and acceptable overbite. In a panoramic radiograph, the presence of lower second premolars of disproportionate dimensions was discovered. When these oversized premolars erupted, the Class I malocclusion tended toward Class III, with an edge-to-edge bite. This created an unstable occlusion and the possible need for extractions.

Key Words: Molarization, Macrodontia, Shape anomaly

When tooth size and morphology are analyzed, a range exists within which a particular tooth will probably be found. The literature dealing with dental morphology describes distinct characteristics that are considered variations within the norm. Teeth occur in widely varying sizes and shapes that do not always correspond to the accepted descriptions. When dental size and anatomy present characteristics that deviate from what is supposed to be the accepted range of normality, they are termed anomalies.[1] It is important to distinguish between what can be called variation and what can be described as anomaly. Dental size of polygenic heredity can complicate the development of good occlusion.

Mandibular second premolars show an elevated variability of crown morphology[2] which, together with a strong genetic influence, determines their position in the dental arch. That is to say, the anatomy of this tooth is particularly unpredictable, as are its eruptive potential and final position in the dental arch.[4] The variation most commonly observed in the crown is the presence of two cusps instead of three. The single lingual cusp occupies the center of the lingual half of the tooth. Other, less frequent variations include the presence of a single vestibular cusp and tetra-cusp morphology, in which there is a vestibular cusp and three lingual cusps.

Apart from these variations, which fall within the range of normal, the mandibular second premolars may present another extremely infrequent anomaly: molarization.[5,6] This molar-like morphology of the premolars consists of a reduction of the single vestibular cusp, the shoulders of which appear as small extra cusps.[5] The resulting appearance is the same as that of a mandibular first molar, with three vestibular cusps and three, two, one, or no lingual cusps.

Numerous cases in which the mandibular second premolars present a variety of differences are found in the literature, including reports of missing teeth,[7] macrodontia, hypoplasia, premolar duplication,[8] dens in dente,[9] peg-shaped teeth,[10] belated supernumerary teeth,[11] and the very occasional molarization.[5,6] These variations may appear as isolated cases—as the one and only anomaly—or together with other anomalies.

In studies of dental anthropology and hominid evolution, descriptions are found, such as that of Australopithecus robustus, in which the premolars are shaped like molars, with large occlusal surfaces and one, two, or three roots.[12] Moreover, in Tibetan immigrants, the presence of four cusps on the

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mandibular second premolars makes these teeth more similar to molars than to first premolars.[13] From an anthropological point of view,[12,14] evolution of the size and shape of mandibular second premolars is established according to influences proceeding from the anterior (incisors and canines) or posterior (molars) teeth. Other research[15] suggests that the reduction in size of the mandibular second premolars, evolving from the molar-shaped morphology of australopithecine to the present-day premolar morphology, has been brought about as a result of evolution.

Case report

This patient was first seen at age 10.8 years. She presented with a mild Class II bilateral molar relationship, with increased overjet, acceptable overbite, and correct alignment in both arches. The panoramic radiograph showed anomalies of size in the unerupted mandibular second premolars.

The patient was observed at 3-month intervals until dental change was concluded. When erupted, the premolars had a molariform appearance and showed distinct differences from the left to the right side, not only in size, but also in shape (Figure 1). The second premolar on the right side had a greater mesiodistal diameter than the first premolar on the same side, and it had three vestibular and two lingual cusps. As described in the literature, this constituted molarization of the premolar. On the left side, the second premolar measured 9 mm and had a molar-like appearance, despite showing a less anomalous morphology than the tooth on the right and possessing but a single vestibular cusp. On the occlusal plane, a Class I bilateral molar and a Class III right unilateral canine were observed. In the lower arch, severe anterior crowding appeared. The overjet disappeared, giving way to an edge-to-edge bite.

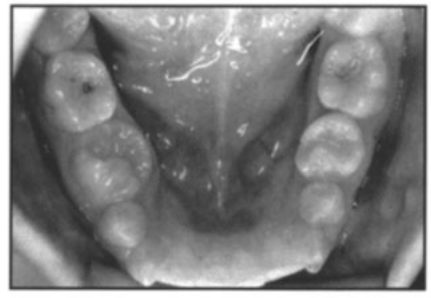

Figure 1
Molariform appearance of the mandibular second premolars

Crowding in the mandibular arch suggested the need for extractions and treatment. However, the patient would not agree to extractions; further appointments were made in order to estimate how the case was likely to evolve over time.

The patient was seen again 2 years later. New casts and a pair of intraoral radiographs showed that the mandibular second premolars had a single root, crowding had worsened appreciably in the lower arch, the bite had opened slightly, and the Class III relationship had became worse. On the right side, the two maxillary premolars met the enormous mandibular second premolar, and the maxillary canine met the mandibular first premolar, creating an unstable occlusal relationship.

Discussion

The appearance of severe crowding was a predictable consequence of the size of the mandibular second premolars. Under normal conditions, the mesiodistal size of the premolar is less than that of its deciduous predecessors, particularly in the case of mandibular second premolars.

The case described here is particularly unusual due to the infrequency with which such anomalies are seen. It is also a clear demonstration of the important role the Bolton analysis can play in achieving ideal occlusion. It is important to include odontometric analysis in diagnosis and treatment planning to determine the size of the teeth so that the desired occlusal harmony can be achieved without unforeseen problems in the final stages of treatment.

References

1. Wheeler RC. A textbook of dental anatomy and physiology. Philadelphia: WB Saunders, 1965.
2. Carlsen O, Alexandersen V. Mandibular premolar differentiation. Scan J Dent Res 1994;102:81-87.
3. Hu JR. Familial similarity in dental arch form and tooth position. J Craniofac Genet Dev Biol 1992;12:33-40.
4. Stemm R. The frequency of malposed unerupted lower premolar teeth. Angle Orthod 1971;41:157-158.
5. Taylor RMS. Variation in morphology of teeth. Anthropoligic and forensic aspects. Springfield, Ill: Charles C. Thomas, 1978.
6. Pindborg JJ. Pathology of the dental hard tissues. Copenhague Ed. Munksgaarol, 1970.
7. Symons AL. Anomalies associated with hypodontia of the permanent lateral incisor and second premolar. J Clin Pediatr Dent 1993;17:109-111.
8. Keur JJ. Duplicated premolar. Oral Surg Oral Med Oral Pathol 1991;71:50-521.
9. Bramante C. Dens invaginatus in mandibular premolar. Oral Surg Oral Med Oral Pathol 1993;76:389-398.
10. Ufomata D. Peg-shaped mandibular second premolar. Oral Surg Oral Med Oral Pathol 1990;70:367-377.
11. Breckton JW. Late forming supernumeraries in the mandibular premolar region. Br J Orthod 1991;18:329-331.
12. Hillson S. Teeth. Cambridge, England: Cambridge University Press, 1986.
13. Sharma JC. Dental morphology and odontometry of the Tibetan immigrants. Am J Phys Anthropol 1986;61:495-505.
14. Bermudez de Castro JM, Nicholas ME. Changes in the lower premolar size sequence during Hominid evolution. Phylogenetic implications. Human Evolution 1996;11-N.3-4:205-215.
15. Calcagno JM, Gibson K. Human dental reduction: Natural selection of the probably mutation effect. Am J Phys Anthropol 1988;77:505-517.