DEVELOPMENTAL VARIATION IN PERMANENT MANDIBULAR SECOND MOLARS – A CASE REPORT.

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Abstract

Observation of developmental variations from the accepted morphology of teeth are relatively fewer in number when compared to dental diseases like caries or periodontitis.Some of these variations are genetically determined as a trait exhibited by a subpopulation differentiated by race. Here we present a case of a permanent mandibular second molar mimicking the occlusal morphology of a permanent mandibular first molar with a 5 cuspal pattern.

***Key words**: Molar,Occlusal morphology,Developmental*

The occurrence of developmental dental anomalies and their prevalence in various population subgroups have always been useful as a phylogenetic tool, to help shed light on the varied expression of traits among different groups.[1] The study of the variation in number of cusps of teeth, apart from being of anthropological significance, can affect treatment and may be specifically, of consequence with regards to occlusion, prosthodontic rehabilitation and for orthodontic tooth movement.

Case Report

A 20 year old female patient reported to the department of Oral Medicine and Radiology desirous of orthodontic treatment. A detailed clinical examination did not reveal any hard or soft tissue pathology. The patient was in class I occlusion with proclined maxillary anteriors and mandibular second premolars showing distoversion. A striking feature that was observed was that all the four erupted mandibular molars showed a five cusp pattern with similar occlusal morphology ie, the mandibular second molars were mimicking the occlusal morphology of the mandibular first molars bilaterally.To determine whether this condition was hereditary, the patients' siblings and parents were examined and were found to show no such variation.

Diagnostic casts and IOPA radiographs were taken as part of routine diagnostic workup. The radiographsshowed two rooted first and second permanent mandibular molars on both sides, which appeared apparently normal. Analysis of the cast showed that on both sides, the permanent mandibular second molar was slightly larger than the permanent first mandibular molar. The distal cusps of the permanent mandibular second molars, unlike those in permanent mandibular first molars normally, were at the same height as that of the mesiobuccal and distobuccal cusps. The grooves and ridges pattern of all four mandibular molars showed no variation from that of a normal permanent mandibular first molar.

Discussion

According to dental anthropology, based on the number of cusps, the teeth can be classified as: 1 cusp – protoconid, 2 cusp – metaconid, 3 cusp –

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hypoconid, 4 cusp – entoconid, 5 cusp – hypoconulid and 6 cusp – entoconulid.

Fig 1: Mandibular arch showing the occlusal pattern of permanent mandibular second molars similar to the first molars on both sides.

Fig2: IOPA of the mandibular molars - right side.

Permanent mandibular second molars frequently exhibit squarish occlusal design with two cusps placed buccally and two lingually with a "+" shaped groove pattern.[1] Several occlusal patterns based on the number, arrangement of cusps and the groove pattern have been described for the mandibular second molars (4-y, +4, 5-y, +5, 6-y and +6).[2]These characteristics are genetically determined and diverse occlusal forms exist among the dentitions of different populations.[3,4]

Hellman (1928) noted that "y-5" was the basic pattern seen on mandibular molars.[2]Tastilian Indians most frequently revealed "+" groove pattern on lower second molars than the other two molars as reported by Devoto and Perrotto (1972).[5] In Alaskan Eskimos, Hasund and Bang (1985) noted a predominant "y-5" on lower first molars, "+5" and "+4" on lower second molars and "+5" on lower third molars.[6]

Montelius (1933) stated that fifth cusp most frequently appeared on mandibular second molars in Chinese and while Loh (1991) reported maximum frequency among the Singaporean population.[2,7]Loh further stated that a four cusped mandibular second molar arise as a result of evolution, because the distobuccal cusp in a five cusped second molar is most variable and often disappears.[7,11]

Contradictory to these findings, Guo et al.,in 1997 stated that a four cusped mandibular second molar was mostly seen when compared to a fifth cusped type with a predominant "+" shaped groove pattern.[8]However,in a more recent study by Ling YK et al., (2010) among southern Chinese, lower second molars were described as having 4 cusps (31%-43%), 5 cusps (43%-53%), 6 cusps (13-18%) and 7 cusps (1%-2%).[9]

Mosharraf R (2010)noted a high frequency of occurrence of a four cusped lower second molar (86%) and a predominant "+" shaped groove pattern (87.6%) in Iranian population. Most frequent occlusal surface configuration was the "+4" form (76.9%) and (71.4%) were bilateral "+4" form. "+5" form had a significantly higher rate in males and "4-y" form had a significantly higher rate in females. Scott GR noted that 6th cusp appeared invariably on the lower second molar when it was not expressed on the first molar in Southwest Indians.[2,10]

Our case presented bilaterally with mandibular first and second molars exhibiting 5 cusps. Apart from the number of cusps, the second molars on both sides were larger mesiodistally compared to first molars. It is well known that mandibular first molar with 5 cusps is always larger mesiodistally compared to mandibular second molar with 4 cusps. This is accordance to the findings of Loh

HS in Singaporean Chinese.[7] The permanent mandibular secondpremolars on both the sides are rotated, perhaps as a result of the lack of space due to the increased mesiodistal dimension of the mandibular molars combined with the force from the erupting third molars. Though most commonly seen among the Chinese and Blacks, 5th cusp for mandibular second molar has been reported in other populations including Indians. But a large scale study would be required to establish the prevalence among different geographical and racial population.

Conclusion

The incidence of variations such as these 5 cusped second molars in the population may be quite low and so to the inexperienced or the unaware, an unexpected encounter in a clinical setting can create a lot of confusion, especially if it's a pathologically affected tooth. Careful examination and case analysis will help treatment planning.

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Conflict of Interest: *None Declared*