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A Rare Familial Occurrence of Bilateral Entoconulid in Maxillary Primary Second and Permanent First Molars in Siblings: Images in Medicine

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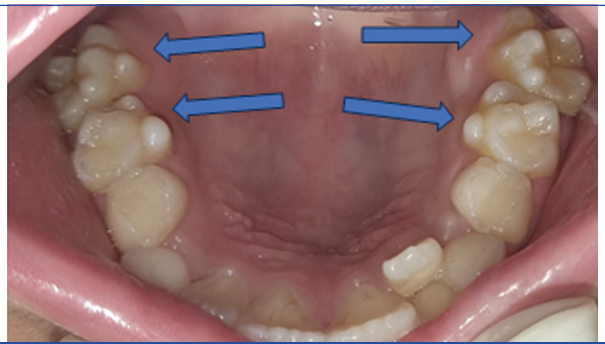
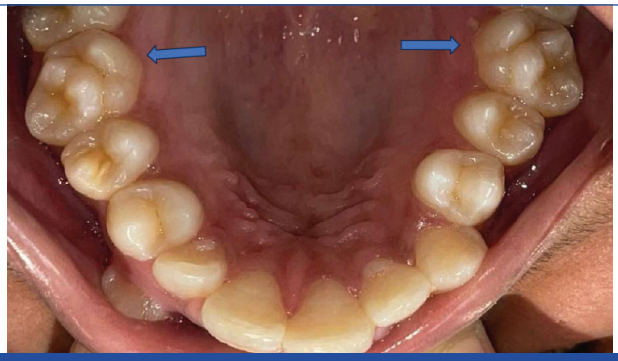
An 11-year-old boy reported to the Department of Paediatric and Preventive Dentistry with a complaint of a carious tooth in the lower left back region of the jaw with no pain or discomfort. The patient had no history of previous medical conditions, ongoing medication, allergy or surgeries. Furthermore, the patient had no history of previous dental procedures or treatments, including restorations or pulp therapies. On further examination, the patient revealed a sixth accessory cusp or entoconulid on both the 2nd deciduous molars and 1st permanent molars in the maxillary arch [Table/Fig-1]. The family history revealed no notable hereditary dental or medical conditions, except for the sister of the patient, a 13-year-old female, who was examined and noted to have a similar entoconulid on the maxillary first permanent molar [Table/Fig-2]. This finding possibly suggested a potential familial tendency or genetic component related to dental morphology. On clinical examination, there was no evidence of caries, pulpal involvement, or periodontal issues. Each additional cusp was not in occlusion and had a groove that separated it from other cusps. Other than preventive measures like pit and fissure sealant, maintaining oral hygiene, and diet counselling, no invasive treatment was advised for the non-occlusion because the accessory cusps did not interfere with the patient's functional bite or cause habitual jaw repositioning.



[Table/Fig-1]: Bilateral entoconulid in the primary second molar and permanent first molar of the case.



[Table/Fig-2]: Bilateral entoconulid in the permanent first molar of the sibling.

Morphological variations in the primary dentition, such as the presence of supernumerary cusps on the maxillary second primary molar, are rare clinical entities. These anomalies typically result from the abnormal proliferation and folding of the inner enamel epithelium during the morpho differentiation stage of tooth development [1].

Building upon this embryological foundation, the unique familial occurrence observed in these siblings- where the trait is mirrored across both the primary second molars (m2) and permanent first molars (M1)- can be explained through modern quantitative genetics. According to the meristic molar field theory, the m2 and M1 function as a cohesive genetic module because they emerge from the same primary dental lamina [2]. This relationship is corroborated by Paul KS et al., (2022), who demonstrated that over 50% of deciduous-permanent homologous traits are significantly genetically correlated. The presentation in this case suggests a state of pleiotropy, where shared genetic signaling (likely involving the PAX and MSX gene families) governs the morphological patterning of the entire molar field within the family lineage, rather than being an isolated developmental accident [2]. A similar study by Paul KS et al., (2021) on genetic analysis of human anterior dental morphology in a longitudinal sample of known genealogy supports that the occurrence of the entoconulid in both the primary and permanent dentitions of these siblings aligns with recent quantitative genetic research [3]. This suggests that a common suite of genes is recruited throughout the various stages of dental development to yield morphologically similar phenotypes in both primary teeth and their permanent successors. This 'genetic conservation' provides a robust biological explanation for the mirroring of accessory cusps seen in this case.

As noted by Jose EA et al., (2020) and similar recent literature [4,5], such complex occlusal surfaces necessitate early clinical identification and the application of preventive measures, like pit and fissure sealants, to mitigate the high risk of carious progression. These morphological anomalies hold significant importance both intra-orally and anthropologically. The presence of additional cusps can lead to dental problems such as caries in the pits, fissures or developmental grooves between the accessory cusp and the tooth, sensitivity or pulpal damage owing to fracture or attrition of the protruded portion of the cusp, which may or may not have pulpal extension. Premature tooth contact leads to occlusal interference and habitual jaw repositioning. Specific anatomical variants can also lead to pulpal or periapical disease with unclear cause and it is most commonly seen with dens evaginatus [4]. Therefore, recognising anatomical variations is crucial for proper diagnosis and treatment. It is noteworthy that entoconulid was present in both the primary and permanent molars in this case. This suggests that when the accessory cusp is present in the primary second molar, the permanent molar may also exhibit the same pattern. This

also suggests a hereditary trait in both siblings and that there is the possibility that the same molar pattern was seen in her primary dentition.

CONCLUSION(S)

In conclusion, the presence of bilateral entoconulids across both primary and permanent dentitions in siblings underscores the significant role of genetic factors in dental morphology. Documenting such rare familial occurrences not only aids in the clinical understanding of dental variations but also provides valuable phenotypic data for anthropological and forensic investigations.

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