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Mandibular Second Molar Protostylid: A Rare Case Report

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Abstract

Aim: The aim of this case report is to present a rare finding of protostylid on the mandibular second molar.

Background: Human teeth of both primary and permanent dentitions sometimes shows developmental malformation which results in alteration of their size, shape and structure and especially with the crown either in the form of anomalous cusps or an increase in the number of cusp. A protostylid is a supernumerary or accessory cusp found on the molars on the mesial half of the buccal surface.

Case discussion: This case report presents a rare finding of protostylid on the buccal surface of the permanent left second molar tooth in a 12 year old female patient. There was no similar finding seen on the other teeth and in other members of the family.

Conclusion: The dental polymorphisms described in this case report is some of the rarest and unique forms of the human dentition. Thus, the reporting and preservation of these structures can be important from the perspective of forensic odontology.

Clinical significance: Though this may not pose significant problem in most instances but its finding is of very much significant interest from the perspective of forensic dentistry.

Key Words: *Dental morphology, protostylid, mandibular molar, extra cusp*

Introduction

One of the most studied components of dental anthropology worldwide is dental morphology, as it seeks to understand the of frequency and variability of coronal and radicular morphology in human teeth.[1, 2] The morphological variations may be seen either involving the crown as anomalous cusps or involving the root in the form of an increase in the number of roots. One such morphological trait seen on the clinical crown is a protostylid, which is studied worldwide. It is a supernumerary cusp located on the mesial half of the buccal surface of molars. Protostylid was first described by Bolk in 1914 as, a "supernumerary tubercle or cusp". It results due to the fusion of taper supernumerary tooth with the adjacent normal tooth. Protostylid is usually located on the vestibular surface of the second and third lower molars and least seen in the first permanent molar. Dahlberg in 1950 identified it on the primary maxillary molars of an Eskimo skull as an accessory or supernumerary cusp. The "mesiobuccal edge prominence" were termed as protostylid by De Jonge- Cohen.[3] However, there is scarcity of literature on protostylids, primarily because of their low prevalence rate. This case report presents an incidental finding of a protostylid on the buccal surface of permanent mandibular second molar along with its clinical significance, especially in the field of forensic odontology.

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Case Presentation

A 12 year old female patient reported to the Department of Pediatric and Preventive Dentistry at Manipal College of Dental Sciences, Mangalore with chief complaint of presence of deposits in the teeth. The past medical and dental histories of the patient were not significant. On intraoral examination patient had permanent set of dentition and the lower left permanent second molar was structurally dissimilar to its antimere in that it had an extra cusp on the mesial half of the buccal surface. The anomaly was diagnosed to be a case of a unilateral protostylid of mandibular left second molar. However this interesting observation made was not relevant to the chief complaint of the patient and was only incidental. The protostylid was noted to be of triangular in shape, measuring about 3mm cervico-occlusally and 4 mm mesio- distally with base at around 1 mm above the gingival margin and its apex around 1mm below the occlusal level *(Fig 1*).

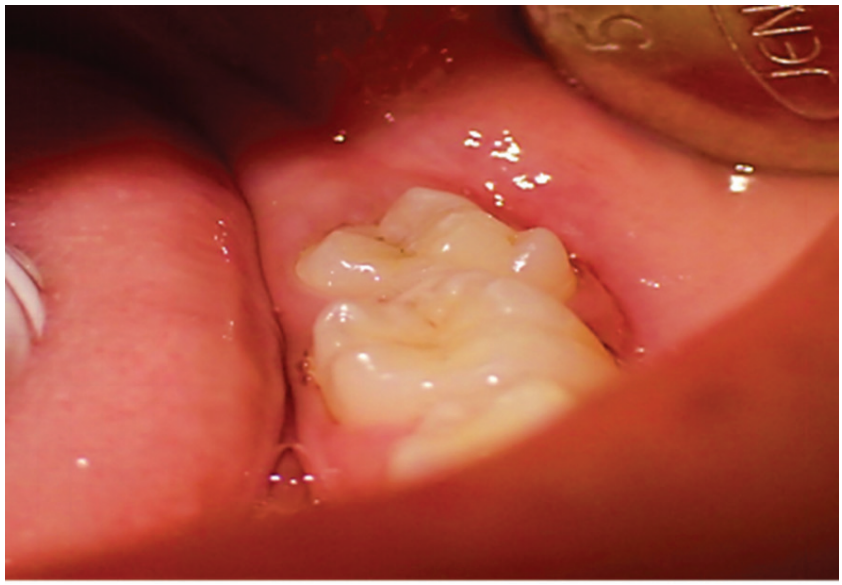

Figure 1: Intraoral image showing protostylid of the lower left second molar.

No similar structure was noticed on the other teeth neither in maxilla and mandible (*Figs 2 and 3).* The tooth was partially erupted. The protostylid was out of function since the tooth was partially erupted and not occluded with the opposing tooth therefore, no occlusal modification was done

Figure 2: Intraoral image of maxillary arch

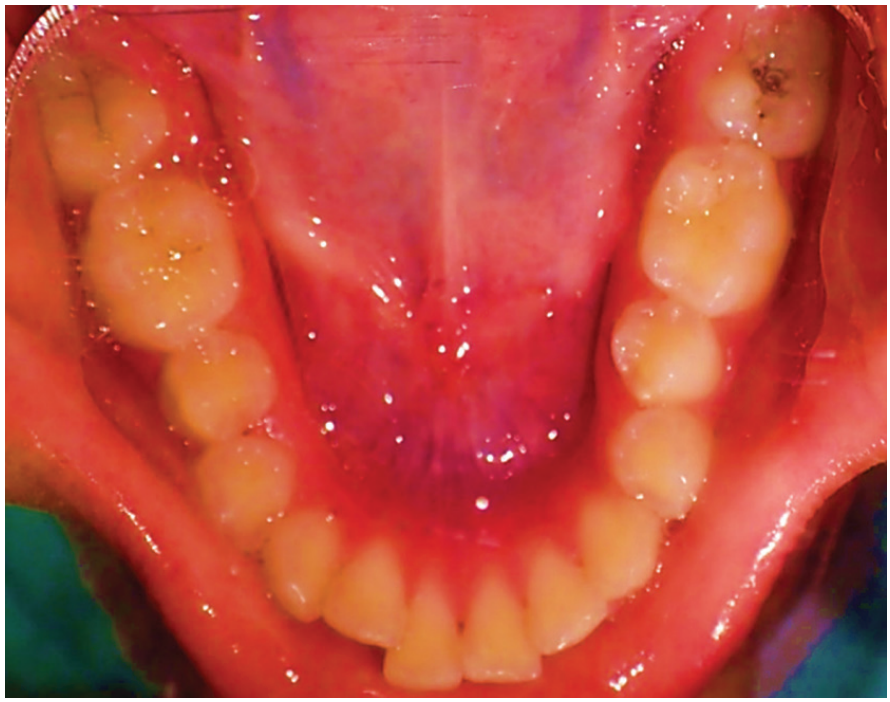

Figure 3: Intraoral image of mandibular arch

Discussion

Literature on dental anthropology has documented several kind of morphological variants, which include dental tubercle (on the lingual surface of the upper lateral incisors); disto- sagittal crest (on the buccal surface of the upper first premolar); carabelli's trait (on the lingual surface of the mesiolingual cusp of the upper molars); and protostylid (on the buccal surface of the upper and lower first molars). Earlier, the etiology of such variation was thought to be the over activity of the dental lamina leading to abnormally shaped cusp or extra cusp. At present it is believed that certain genes like PAX and MSX are responsible for this anomaly.[4, 5]

This case report presents a rare case of protostylid seen as an accessory cusp on mandibular second permanent molar in a child patient of 12 years. According to the literature its prevalence in Asian population is only 2 % [6] and existence of such an accessory cusp can thus provide important information on the ethnic or racial background of the individuals, with special significance in the field of forensic odontology. It has been reported that the presence of protostylid in primary molars is a predilection for its presence in permanent molars.[7] In our case, the parents were unaware of the presence of such an extra cusp in the primary molar and so we could only assume regarding its presence in the primary dentition. Upon asking the family history, parents revealed a negative history and even on clinical examination no such extra cusp was seen in parents and siblings.

The protostylid is a paramolar cusp (that does not make part of the functional occlusal table) that may vary in shape from a furrow to a free-apex cusp on the vestibular surface of the mesial vestibular cusp of the second lower deciduous molars and of the first and second lower permanent molars. It can also be expressed as a vestibular fossa or fovea on a furrow of vestibular development. Protostylid is categorized into eight categories by Arizona State University Dental Anthropology System (ASUDAS) [8] wherein zero and one is considered as absence of protostylid and two to seven is considered to be present. In the present case, protostylid belonged to the grade 7 as the presence of free vertex cusp was noted.

The presence of protostylid is of clinical significance, as it can lead to difficulty in stainless steel crown placement, failure of pulpectomy due to chances of missing a canal, interference with bracket cementation, banding and preventing appropriate alignment during orthodontic treatment, gingival and periodontal problems due to increased chances of plaque accumulations, increased caries incidence and even frictional keratosis when it is sharp.[9] Apart from the clinical complications,

its presence is of significance even from the point of view of forensic odontology. It may aid in identification of suspects through bite marks on living/ nonliving objects. Dental identification is primarily used to confirm the identities of unknown persons when identification by other means such as DNA or fingerprints is not possible in disaster situations that result in skeletonization, decomposition, severe burning or charring[10] of the individuals beyond recognition, especially in disasters that involve multitude of casualties.[11] Each individual have got different dental characteristics and features. This could help in identification of unknown individuals during mass catastrophes and more over being the strongest part of the body, teeth are durable and are capable of resisting damage unlike the other structures of the body.[11, 12] Thus, it is important that the dentist identifies such dental anomalies and maintains a record of the same.

In this case, intraoral periapical radiograph was not taken to avoid unnecessary radiation exposure to the patient, and also no occlusal modifications were carried out as the accessory cusp was not causing any functional complications. The patient was instructed to maintain a good oral hygiene, after making the parents and the patient aware of the condition and advised regular monitoring for early detection of dental caries.

Conclusion

Presence of additional tooth projections in children requires routine periodic dental evaluation. Early diagnosis and management are important if complications are to be avoided. The dental polymorphisms described in this case report is some of the rarest and unique forms of the human dentition. Thus, the reporting and preservation of these structures can be important from the perspective of forensic odontology.

Clinical Significance

Each individual have got different dental characteristics and features. From forensic odontology aspect presence of protostylid is of very much clinical significance. This could help in identification of unknown individuals during mass catastrophes and more over being the strongest part of the body, teeth are durable and are capable of resisting damage unlike the other structures of the body. Thus it is important that the dentist identifies such dental anomalies and maintains a record of the same.

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References

1. Rodríguez CD, Delgado ME. Dental anthropology: A brief definition. *International Journal of Dental Anthropology* 2000; 1: 2-4.
2. Rodríguez JV. Teeth and Human Diversity: Progress of Dental Anthropology. Bogotá: National University of Colombia; 2003.
3. Appadurai R, Lingeshwar D, Missier MS, Maila SV. Permanent mandibular protostylid: A rare developmental anomaly and its overview. *Indian Journal of Dental Research* 2018; 29: 244-6.
4. Turner RA, Harris EF. Maxillary second premolars with paramolar tubercles. *Dental Anthropology* 2004; 17: 75-8.
5. Brook AH. Multilevel complex interactions between genetic, epigenetic and environmental factors in the aetiology of anomalies of dental development. *Archieves of Oral Biology* 2009;54 Suppl 1:S3 17.
6. Hanihara K. Morphological pattern of the deciduous dentition in the Japanese American hybrids. *Journal of Anthropological Society of Nippon* 1968; 76: 114–21
7. Nirmala S, Gaddam KR, Vimaladevi P, Nuvvula S. Protostylid: A case series. *Contemporary Clinical Dentistry* 2013; 4: 349-52.
8. Turner CG 2nd, Nichol CR, Scott GR. Scoring procedures for key morphological traits of the permanent dentition: The Arizona State University dental anthropology system. In: Nelly MA, Larsen CS, editors. Advances in Dental Anthropology. New York: Wiley-Liss; 1991.
9. Desai VD, Sadnani H, Kumar SM, Pratik P. Protostylid: As never reported before! A unique case with variation. *Journal of Indian Acadamy Oral Medicine and Radiology* 2016; 28: 57-60.

10. Valenzuela A, Martin-de las Heras S, Marques T, Exposito N, Bohoyo JM. The application of dental methods of identification to human burn victims in a mass disaster. *International Journal of Legal Medicine* 2000; 113: 236-9.
11. Pretty IA, Sweet D. A look at forensic dentistry – Part 1: The role of teeth in the determination of human identity. *Brazilian Dental Journal* 2001; 190: 359-66.
12. Hinchliffe J. Forensic odontology, Part 1. Dental identification. *Brazilian Dental Journal* 2011; 210(5): 219-24.