

Parastyle with double cusp formation- Report of a very rare entity

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Abstract

Parastyle is a developmental tooth anomaly that has a rare occurrence in human population. It refers to an additional cusp occurring on the buccal surface of a permanent maxillary molar. Parastyle is usually observed on the Mesiobuccal cusp (paracone) and rarely on the distobuccal cusp (metacone). Additionally, multiple cusp formation is considered to be highly rare. This paper reports of a rare case of an anomalous dental trait like 'Parastyle with double cusp formation' which was an incidental finding on the left permanent maxillary second molar of a 56 years old Bengali male.

Keywords: Maxillary molar, metacone, paracone, Parastyle

Introduction

Human dentition shows a high diversity in the morphology, one of the most uncommon variation in the morphologic feature being a 'Paramolar tubercle'.^[1] Paramolar tubercle refers to any stylar anomalous cusp, supernumerary inclusion, or eminence occurring on the buccal surface of upper and lower premolars and

molars.^[2] Its occurrence in man was first described by Bolck^[3] in 1916 but was introduced in the paleontological nomenclature in 1945 by Dahlberg^[4] who referred to this structure as "protostylids" if associated with the mandibular molars and "Parastyle" when present in the maxillary molars.

Parastyle is an accessory cusp or tubercle on the buccal surface of the Mesiobuccal cusp (paracone/ cusp 2) of maxillary molars and is rarely noted on the distobuccal cusp (metacone/ cusp 3) of the maxillary molars and buccal surface of maxillary premolars. The cusp formation may vary in size and if it is very large, it may be associated with a separate root formation. A double cusp formation very rarely takes place. The cusp formation is also variable in its pattern- there may be a furrow or groove formation with or without the association of an enamel swelling.^[5]

Parastyle is relatively a rare entity with a prevalence rate of approximately 0–0.1% in maxillary first, 0.4–2.8% in second, and 0–4.7% in the third molars. Its bilateral occurrence in deciduous dentition and unilateral

occurrence in permanent dentition has been reported.^[6] However, there is lack of adequate data regarding sex predilection and racial prevalence, although a higher occurrence in Indians has been reported as compared to other populations.^[5, 7] Hence, these have a significant role in anthropological studies for individual's forensic identification.

Case Report

A 56-year-old male patient reported in the Department of Oral Medicine and Radiology of Kusum Devi Sunderlal Dugar Jain Dental College and Hospital, Cossipore, Kolkata in May 2022 with a chief complaint of pain in the left lower back tooth region since past 3 days. Medical and family histories were non-contributory. No abnormalities were detected on extra-oral examination. Complete intra-oral examination revealed poor oral hygiene status along with proximal caries in 35, 36 with no soft-tissue abnormalities. It further revealed the presence of two paramolar tubercles situated side by side on the buccal aspect of 27 as an incidental finding [Figure 1]. Both the tubercles were observed to be conical in shape and clearly delineated from each other and from the associated tooth by a groove. The mesial one located on the mesial aspect of buccal surface of Mesiobuccal cusp measured 4 mm mesio-distally and 5 mm cervico-occlusally and the distal one with dimensions 5 mm mesio-distally and 7.5 mm cervico-occlusally was noted on the distal aspect of buccal surface of Mesiobuccal cusp and extending over the distobuccal cusp covering a major portion of facial developmental groove. The base of each extended till the gingival margin with apex pointed occlusally but well below the occlusal plane. The tubercles were found to have round apices with smooth buccal surfaces extending downward straight to the cemento-enamel junction [Figure 2 & 3].



Figure 1: Intra-oral view of Para styles.



Figure 2: Demonstration of Para styles on dental cast (Buccal view)



Figure 3: Demonstration of Para styles on dental cast (Occlusal view)

Intra-oral periapical radiograph of 27 [Figure 4] showed two U-shaped radio-opacities involving the Mesiobuccal cusp and mesial half of distobuccal cusp of the second maxillary molar, which are merging with rest of the

tooth in the cervical area, with no evidence of root structure.

Based on clinical and radiographic findings, a diagnosis of Parastyle with double cusp formation irt 27 was made. The patient was unaware of their presence and was asymptomatic as the tubercles showed no evidence of a carious lesion.



Figure 4: IOPAR showing Para styles.

Discussion

Parastyle is a non-metric dental trait, the etio pathogenesis of which still seems controversial but it may give insights to dental evolution and development. Developmentally, dental cusps begin their formation during the early bell stage, well before calcification of the tooth has begun. The cells of the inner enamel epithelium proliferate and produce activators and inhibitors while they are being deposited in sequential layers from the cusp apex toward the neck of the crown starting from an enamel knot. Enamel knots are sites of non-dividing cells that occur in the stellate reticulum as projections from the inner enamel epithelium. The activator produces a primary enamel knot until the concentration reaches a threshold that induces an inhibitor that neutralizes the activator. The primary enamel knots produce substances that promote mitotic growth in the adjacent inner enamel epithelium. Since

the knots themselves are non-dividing, this creates irregularities in the inner enamel epithelium and secondary enamel knots appear. Research demonstrates that the primary enamel knot configures the occlusal table of premolars and molars, while later forming secondary enamel knots individually constitute the cusps during amelogenesis. Parastyle seems to arise during the morphogenesis process starting from an accessory enamel knot developed at the surface. Furthermore, it has been suggested that PAX, MSX and RUNX genes influence most characteristics of tooth shape and pattern, which can be altered by modulating the signal pathways, organized into complex networks, mediating epithelial-mesenchymal interactions in developing teeth.^[8-15]

In 1974, Joseph F Katich and Turner formulated a classification based on the expression and degree of Parastyle, in order to describe the different clinical presentations of this anomaly. The features include:

1. Buccal surfaces of the cusps 2 and 3 are smooth
2. Pit present in or around the buccal groove between cusps 2 and 3
3. Small cusp present with attached apex, usually on the cusp 2
4. Medium-sized cusp with free apex present on the buccal surface
5. Large cusp with free apex on the buccal surface
6. Very large cusp present with free apex on the buccal surface
7. Free peg-shaped crown attached to the third molar root^[16]

In the present case, due to double cusp formation, the case doesn't conform to the above classification.

The Para styles are clinically relevant as they may pose various problems and influence the treatment modalities in many dental disciplines. These superstructures are potent sites for plaque retention resulting in dental

caries, gingival inflammation, and localized periodontitis as maintenance of oral hygiene in these areas is difficult. In addition to gingival recession and a lowered buccal alveolar bone level, the grooves that separate the tubercles from the teeth may extend onto the root surfaces to various depths resulting in vertical bone loss along the groove and deterioration of the surrounding periodontal health. Furthermore, an additional root canal within the tubercle presents a special problem in endodontic therapy. When pulp is present in a paramolar tubercle, the relationship between the pulp of the tubercle and that of the tooth must be determined. If the root canal of the tubercle is connected with the main canals, then both should be treated at the same time. During orthodontic treatment, paramolar tubercles interfere with cementation of the brackets and correct alignment of orthodontic archwires and thus may need to be removed by ameloplasty. In Prosthodontics, these may pose problem in the tooth preparation for an artificial crown. However, in the present case, the tooth and the associated tubercles were clinically sound with uncompromised periodontal health.^[17-20]

Conclusion

To conclude, Parastyle is a relatively uncommon dental trait and its double cusp formation is still a more uncommon phenomenon. Report of such a rare morphological anomaly will not only enhance the knowledge of the dental practitioners but will also make them aware about its diagnosis, management, ethnic variabilities and importance in forensic identification.

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