



Rare Maxillary Molar Protostylid: A Case Report

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ABSTRACT: Variations in tooth morphology form a unique identifying feature for an individual. Among the numerous variations we see among humans, some variations are in their dentition. There is diversity of morphological variations that we find in dentition. Also these variations are relevant in the study of human evolution. These morphological features of teeth have been useful in anthropological studies also. This case report presents a rare yet normal variant of human dental morphology, a Protostylid on a maxillary molar.

KEYWORDS: Protostylid, accessory cusp, dental anomaly

I. INTRODUCTION

A protostylid is a supernumerary cusp located on the mesial half of the buccal surface on the upper and lower molars.[1] The existence of protostylid in maxillary second molars is extremely rare ranging from 0.4% to 2.8% in various populations. These are sporadic among Africans and Europeans whereas more common in native americans. Asian population are said to have a prevalence rate of 2%.[2]

Etiology is unknown however, it was said that these features are probably due to overactivity of the dental lamina. But at present, it is believed that PAX and MSX genes are responsible for its expression.[3] Since very few cases of protostylids have been reported till date, not much study has

been done on them. This case report aims to provide an insight on the diagnostic, clinical and functional problems posed by a protostylid and also on its significance in dental anthropology and forensic sciences.

CASE REPORT

This case report presents an accidental finding of a protostylid on the buccal cusp of a maxillary left second molar of a 17 year old male patient who reported to a dental centre for a routine dental check up. There was no relevant medical and dental history and his vital statistics were within stable limits. On intraoral examination a well formed additional cusp with a conical appearance was seen projecting from the buccal surface of left maxillary first permanent molar to more than half the distance between cemento enamel junction and occlusal plane (Fig.1 and 2). Its base was towards the cemento enamel junction and apex towards the occlusal surface and it was out of occlusion with the opposing arch. The cusp measured approximately 4mm cervicoocclusally and 3mm mesiodistally. Diagnosis of a grade 6 protostylid according to Haniharas classification was made. The patient was informed about its presence, oral prophylaxis was done and he was given oral hygiene maintenance instructions. He was recalled for topical fluoride applications at regular intervals.



Fig 1: Occlusal view of maxillary left second molar showing protostylid



Fig 2: Buccal positioning of protostylid



Fig 3: Maxillary and mandibular casts of patient



Fig 4: Occlusal view of protostylid in cast



Fig 5: Protostylid is out of occlusion when casts are in occlusion



II. DISCUSSION

Protostylid was first described by Dahlberg(1950) on the primary maxillary molars of an Eskimo skull.[4] It is derived from the anterior portion of the buccal cingulum of the molars. The protostylid trait may present as a shallow depression through pits and grooves of varying depths, as tubercles or as a fully developed cusp. Hanihara provides a classification consisting of seven grades of protostylid.[5] Grade 0 indicates absence of a protostylid, grade 1 to 4 indicate presence of surface irregularities, grade 5 and 6 indicate strongly developed cusps. Protostylids most commonly present as buccal pits. Usually bilaterally and rarely as a fully developed cusp. They are more common on primary molars than permanent molars.[6,7] Unilateral protostylid on a permanent maxillary molar reported in this case report is very rare. Whenever the protostylid was present on the permanent molars it was also found on the primary molars. The reverse was not always true.[1] Microscopic studies reveal that the amelodentinal junction beneath a protostylid pit has the shape of a small cusp indicating that the pit is the beginning of a cusp formation and that its origin is during the morphogenetic phase of tooth development.[8] This evidence along with the particular location in which protostylid occur confirm that it is in fact a cusp.

The differential diagnosis of protostylid pits may include pits of enamel hypoplasia. The

two can be differentiated microscopically by the nature of the underlying amelodentinal junction. Its elevation to form a cusp, presence of surface aprismatic enamel and stunted enamel prisms indicate protostylid.[9,10,11]

Protostylids are benign and may not be a cause of concern in a patient. However they may cause certain diagnostic, clinical and functional problems because of which they require regular dental monitoring. Protostylid pits and areas between cusp and tooth can cause food lodgment and plaque retention making them vulnerable to caries and periodontal diseases. Premature tooth contact can lead to occlusal interference, habitual repositioning of the jaw and temporomandibular joint disorders.[12] Protostylids may interfere with banding of molar bands, cementation of brackets and correct alignment of orthodontic arch wires. [13] In such cases they may be removed by selective grinding. Presence of a well developed protostylid cusp may indicate the presence of an extra root and hence an additional root canal. While performing root canal treatment for such a tooth, if the protostylid root canal is seen to be joined with the main root canals of the tooth, the protostylid canal has to be treated too.[14]Fracture or attrition of a protostylid with pulp tissue may cause sensitivity or pulpal pathosis. Protostylids may cause difficulties while doing tooth preparation for stainless steel and ceramic crowns. The protruded cusp may cause soft tissue irritation.

Table: Classification of protostylid by Hanihara (1961)[15]

Type 0 – Absent	Buccal groove is straight and no trace of irregularity
Type 1 – Absent	No evidence of protostylid, but the beginning of one is suggested by the curvature and branching of the buccal groove. There may be a small, but distinct pit at the lower end of the buccal groove separating protoconid from the hypoconid and the buccal groove is slightly bent in a distal direction at the point of the pit.
Type 2 – Present 1	Divergence of buccal groove is more developed than Type 3. Small triangular area with tip downwards between the branches of the buccal groove.



Type 3 – Present 2	The two branches of the buccal groove are more developed than type 3. Small triangular area with tip downwards between the branches of the buccal groove.
Type 4 – Present 3	A very shallow groove appears at the corner of the buccal surface. The area between this groove and mesial branch of the buccal groove bulges slightly and gives triangular shape with its tip upwards.
Type 5 – Present 4	Triangular area is more strongly developed than Type 5.
Type 6 – Present 5	Protostylid is strongly developed so that the tooth seems to have an extra cusp on the buccal surface.

III. CONCLUSION

Protostylid trait is a constant feature of the human dentition, only the degree of expression is variable in individuals and populations as it is genetically controlled. They have great significance anthropologically as well as in forensic sciences and every effort should be made to preserve this unique characteristic. Its study can provide information on the evolutionary development and diversification of a population. Also protostylids are an unique identifying feature for an individual and may play an important role in human identification in mass casualties, identification of a deceased individual in circumstances when all other human remains have been destroyed, also in classification of bite marks on bodies and inanimate objects.

CONFLICTS OF INTEREST

The author has none to declare.

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