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Case Report

A Rare Developmental Anomaly – An Accidental Finding

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Abstract

Introduction: Presence of extra cusps may have dental problems such as caries in the pits or developmental grooves between the accessory cusp and the tooth, sensitivity or devitalisation of tooth due to fracture or attrition of the protruded portion of the cusp that has pulpal extension.

Case Report: A series of case reports highlighting the presence of central accessory cusp in the maxillary second primary and first permanent molars. The problems frequently encountered due to such a presence and the preventive measures needed to tackle such problems are discussed.

Conclusion: Presence of these extra cusps may have dental problems such as caries in the pits or developmental grooves between the accessory cusp and the tooth, sensitivity or devitalisation of tooth due to fracture or attrition of the protruded portion of the cusp that has pulpal extension.

Hence, careful monitoring of such cases is needed and early and prompt management should be implicated as soon as such findings are noted.

Keywords: *Central Accessory Cusp; Dens Evaginatus; Developmental Anomaly*

Introduction

Expression of odontogenic genes is the important source of morphological change in any individual teeth and or the dentition as a whole. Various signalling factors are produced by transcription factors that are encoded by these genes [1]. Mutations in developmentally regulated genes will cause the congenital malformation of teeth in humans [2]. During each stage of tooth development, these mutations can occur [3]. Central cusps are situated between the buccal and lingual cusp tips on the occlusal surface of the premolars and molars and on the lingual surfaces of the incisors and canines [4]. Schulze in 1987 suggested that the central accessory cusps are mainly characteristic of the East Asian populations [5]. Table 1 shows the prevalence rate of these cusps in different populations. According to Schulze, there are five variations based on the location of the central cusp.

Author(s)	Year	Population	Prevalence %
Yumikura and Yoshida	1936	Japanese	1.09
Kato	1937	Japanese	0.50
Pedersen	1949	Eskimo (Greenland)	1.29
Lau	1955	Chinese	1.44
Wu	1955	Chinese	1.52
Oehlers	1956	Malays	-
Sumiya	1959	Japanese	1.88
Merrill	1964	Eskimo (Amerindian)	4.30
Oehlers., *et al.*	1967	Chinese (Malays)	-
Curzon., *et al.*	1970	Eskimo (Canada)	3.00
Yip	1974	Chinese	3.60
		Malay	1.10
		Indo-europoid	-
Reichart and Tantiniran	1975	Thai	1.01
Goto., *et al.*	1979	Japanese	0.12
Lin and Roan	1980	Chinese (Taiwan)	3.52
Villa	1956	Filipino	-
Villa., *et al.*	1959	Filipino	-
Poyton and Vizcarra	1965	Filipino	-
Senia and Regezi	1974	Filipino	-
Palmer	1973	Caucasian (British)	-
Sykaras	1974	Caucasian (Greek)	-
Pearlman and Curzon	1977	Negro	-
Ciechanowski and Sonnenberg	1981	Negroid	-
Kocsis., *et al.*	2002	Hungarian	47.6

Table 1: *Prevalence of central accessory cusps in various populations. Kocsics., et al. 2002 [4].*

1. A cone like enlargement on the lingual cusp
2. A tubercle on the inclined plane of the lingual cusp
3. A cone-like enlargement of the buccal cusp
4. A tubercle on the inclined plane of the buccal cusp
5. A tubercle arising from the occlusal surface obliterating the central groove [4].

Though central accessory cusps or dens evaginatus have been reported scarcely in primary molars, owing to the fact that they are presented to the dentist in a grossly decayed condition they go unnoticed often. The following cases show the common occurrence of central accessory cusps in primary molars and throw light on the fact that they require early preventive care and regular follow up.

Case 1

A 9 year old male child reported to the department of Pediatric and Preventive Dentistry with a chief complaint of forwardly placed upper front teeth. On routine intra oral examination, a central accessory cusp was noted in the upper second primary molars and first permanent molars on both sides. A talon's cusp was also noted in the lingual surface of the right maxillary permanent central incisor.

Figure 1

Case 2

A 8 year old female child reported to the department of Pediatric and Preventive Dentistry with the chief complaint of pain in the upper right and left back teeth region. Intra oral examination revealed dental caries in 54, 55 and 64, 65.

In addition, central accessory cusps were seen in relation to 55, 16 and 65, 26.

Figure 2

Case 3

A 10 year old male child reported to the department of Pediatric and Preventive Dentistry with the chief complaint of pain in the right lower back teeth region. Intraoral examination revealed dental caries in 84, 85.

In addition, central accessory cusps were seen in relation to 55, 65 and also a Talon's cusp in relation to 11 and 21.

Figure 3

Case 4

A 8 year old male child reported to the department of Pediatric and Preventive Dentistry with the chief complaint of trauma to the upper front teeth. Intra oral examination revealed avulsion of 12 and 21 and also dental caries in 65, 26.

In addition central accessory cusps were noted in relation to 55, 16 and 65, 26.

Figure 4

Discussion

First reported case of an enamel tubercule was on the third maxillary right molar on a Eskimo skull [6]. Subsequently many authors have reported the incidence of accessory cusps on premolars, molars, incisors and canines in different forms [7-12]. Occlusal cusps are predominantly seen in premolars.

1. Cusps grown out of buccal cusps and
2. Cusps grown out of the middle of the occlusal surface [9].

These cusps can be smooth, grooved, terraced or ridged. The classification was further modified to include a double lingual cusp as sub-group to the second group [12]. Finally, both the classifications were combined into one class and were named as dens evaginatus [5,13].

The central cusp has been given other names such as "supernumerary occlusal cusp", des evaginatus", "accessory central cusp", "tuberculated premolar" and "Leong's premolar" [10,12,14-16].

The exact etiology for the formation of the extra cusp is unknown. Previously, it was said to be genetically modified due to the overactivity of the dental lamina but recent studies suggest that the PAX and MSX genes are responsible for such a development [17]. The extra cusp is believed to develop from an abnormal proliferation and folding of a portion of the inner enamel epithelium and subjacent ecto-mesenchymal cells of the dental papilla into the stellate reticulum of the enamel organ during the bell stage of tooth formation [9,10,18]. The resultant formation is defined as a tubercule or supplemental solid elevation on some portion of the crown surface. Current embryological studies propose that the tooth morphogenesis is characterised by transient signalling centers in the epithelium, consisting of epithelial cell clusters that correspond to the initiation of individual cusps [18,19].

In lobodontia, there is occurrence of central cusps on both premolars and molars in an unusual triad: microdontia, taurodontia and dens invaginatus [20]. Another incidence linked the presence of a non-characteristic dens evaginatus with the Ekman-Westborg-Julian syndrome in a 5 year old child in the 5th century literature [21]. Kocsis., *et al*. reported a case of lobontia in a 16 year old boy, where the anomaly affected practically all the teeth. After eruption of the left lower third molar the patient was examined and on the occlusal surface of the tooth, a large central cusp was noted and surrounded by more than 10 smaller cusps separated by a deep groove [4].

The presence of such anomalies may pose various dental problems to clinicians, such as development of caries in the pits or deep developmental grooves between the accessory cusp and the tooth, sensitivity or devitalisation of the tooth due to fracture or attrition of the protruded portion of the cusp that has pulpal extension, premature tooth contact that leads to occlusal interference and habitual posturing of the jaw [22].

The presence of these accessory cusps make very difficult to maintain routine oral healthcare in those sites. As the pits and grooves surrounding the cusps are highly susceptible to caries it is necessary to seal them at once. Premature contacts or occlusal interferences if present should be removed to prevent development of tempero-mandibular disorders or habitual posturing of the jaws. The anomalous teeth should be kept under periodic monitoring to check for caries status and pulp vitality [22-24].

Conclusion

The presence of accessory cusps in these cases was an incidental or rather accidental finding. Though it is reported as rare but we feel many of these cases either go unnoticed or report to the clinic in a grossly decayed condition that these cusps get obliterated. Hence, careful monitoring of such cases is needed and early as well as prompt management should be implicated [22-24].

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