

# Occurrence of Cusp of Carabelli in Primary Second Molar Series of three Cases

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## ABSTRACT

Morphological variations are seen in both primary and permanent dentitions. Cusp of Carabelli is also one of them. It is suggested that it is due to over activity of dental lamina but definitive aetiology is unknown. It is a type of accessory cusp, occurs more often in permanent maxillary first molars, whereas, its occurrence in primary tooth is rare. The present case series discusses the presence of cusp of Carabelli in primary maxillary second molars in three different cases. This case series will help clinicians to identify, diagnose and take proper preventive care and also adds to the incidence in literature.

**Keywords:** Accessory cusp, Carabelli trait, Maxillary molars

The cusp of Carabelli, is also known as Carabelli tubercle, *tuberculum anomale* of Georg Carabelli. It was first described in 1842 by the Hungarian Georg Carabelli. This is a morphological variation which takes the form of fifth cusp or it can grade down to a series of grooves, depressions or pits on the mesial portion of the lingual surface. This cusp is found lingual to the mesiolingual cusp of maxillary first permanent molar, which is the largest of the well-developed cusps and becomes less prominent in second and third molars [1,2].

The aetiology is unknown, but it is suggested that it might be due to overactivity of dental lamina. A genetic and exogenous factor seems to have an influence on formation of this cusp [3]. The incidence of this cusp is more in maxillary permanent first molar and rarely seen in primary second molars. The presentation is usually bilaterally. The frequency of occurrence is reported to be high in Europeans than in Asians. Males are more affected than females at the ratio 1.2:1 [4].

Not many studies have been done or reported about the cusp of Carabelli and its influences. It is seldom seen in primary dentition. This case series describes three individuals with cusp of Carabelli in primary maxillary second molar which is a rare presentation.

## CASE 1

A seven-year-old male patient reported (accompanied by parents) with a chief complaint of food lodgment in upper back tooth region. Patient was visiting dentist for the first time. Extraorally no abnormalities were noticed, on intraoral examination, it was noticed that the child had mixed dentition with maxillary permanent centrals and permanent molars erupted and deep proximal caries was found in left deciduous first molar. It was observed that there

was a presence of prominent cusp of Carabelli in primary second molars bilaterally. Based on the Dahlberg classification [5], cusp was classified as, Dahlberg Type 6. Presence of Carabelli cusp was also noticed bilaterally, on permanent first molars [Table/Fig-1].

Based on the chief complaint, parents were suggested stainless steel crown as a restoration. Since parents refused for that, a temporary restoration was done with zinc oxide eugenol cement. The groove separating the prominent cusp was discolored and sealant was placed in subsequent visit.

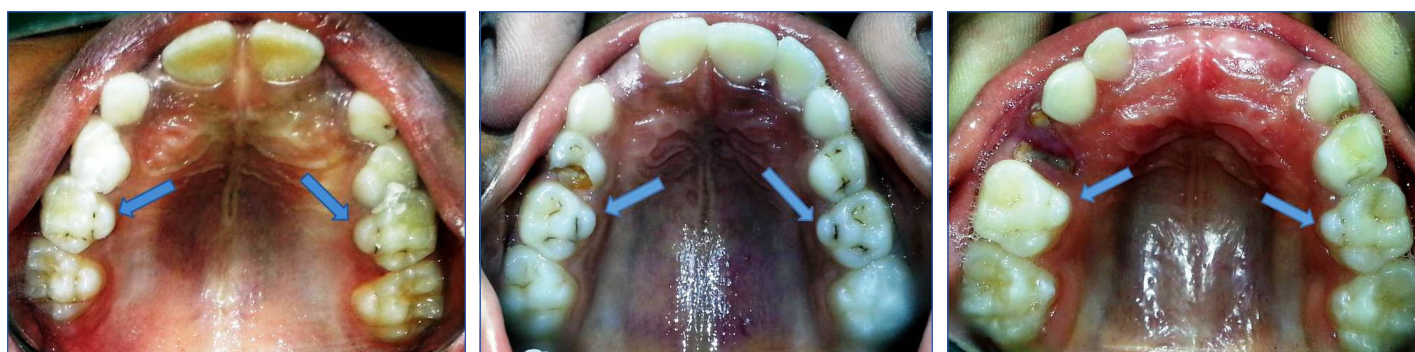
## CASE 2

An eight-year-old male patient reported (accompanied by parents) with a chief complaint of unerupted permanent front tooth. On intraoral examination, it was observed that the patient had mixed dentition and left deciduous first molar was carious. The parent was assured that permanent lateral will erupt; presence of the tooth was confirmed with a radiograph. Pulpectomy of maxillary left deciduous first molar was carried out as treatment plan and in the next appointment placement of sealants done for other molar teeth.

But interestingly, there was a prominent cusp of Carabelli in the primary second molar tooth bilaterally in a shape of small tubercle (Type 5). But contrary to the first case, it was not prominent in permanent molars [Table/Fig-2].

## CASE 3

A six-year-old female patient reported with a complaint of pain in upper right back tooth region. An intraoral examination revealed the presence of root stumps of primary maxillary right first molar teeth,



**[Table/Fig-1]:** Cusp of carabelli in primary maxillary second molar and maxillary permanent first molar edited. **[Table/Fig-2]:** Prominent cusp of Carabelli in primary maxillary second molar teeth bilaterally. **[Table/Fig-3]:** Prominent cusp of Carabelli in maxillary primary second molar bilaterally. (Images left to right)

and proximal caries in the maxillary left primary canine. Extraction of root stumps and space maintainer was suggested along with restoration of canine. The presence of prominent cusp of Carabelli was seen in this case bilaterally (type 6) in the primary second molar as well as in permanent first molars [Table/Fig-3].

All the three case reports showed the presence of prominent cusp of Carabelli in maxillary primary second molar as well as on maxillary permanent first molars. Presence of Carabelli trait in primary molars is rare.

## DISCUSSION

Carabelli's cusp is a type of accessory cusp which may vary in size and shape, composed of enamel, dentine with or without pulpal extension. The genetic aetiology of cusp of Carabelli suggests that the genes *PAX* and *MSX* genes are responsible [3].

The evolutionary perspective of this cusp is that it is an adaptation in the buccolingual direction which might fade off with aging. The functional perspective being able to bear the biomechanical stress by broadening the occlusal table of molar tooth [5].

Even though it is non-functional, it can be used to distinguish population, also used in forensic and anthropological studies [6]. The groove separating the cusp may be prone to caries and there might be problems in placement of orthodontic bands due to improper adaptation [4].

Keerthiga M [6]	2016	Carabelli trait in mixed dentition Indian population
Kamatham R [8]	2014	Carabelli trait in mixed dentition Southern Indian children
Townsend GC [9]	1981	Carabelli trait in Australian dentition
Smith P [10]	1988	Carabelli trait in mixed dentition in Israel
Thomas CJ [11]	1986	Carabelli trait in mixed dentition in South Africa
Kieser JA [12]	1984	Carabelli trait in mixed dentition
Nagarajan S [13]	2009	Case report on bilateral occurrence of Carabelli cusp in deciduous maxillary 2nd molar
Sadatulla S [14]	2012	Prevalence study of Carabelli trait in Saudi Arabian children
Herman K [15]	2014	Prevalence study of Carabelli trait in Poland children
Roopa KB [16]	2015	Case report on bilateral occurrence of Carabelli cusp in deciduous molars

**[Table/Fig-4]:** List of studies on Carabelli trait in deciduous dentition [6,8-16].

As per previous Indian studies, 52.77% of maxillary permanent molars displayed a Carabelli tubercle [7]. Carabelli's trait was present in 26-27% of Asian population. High expression of Carabelli trait (89.8% in primary second molars) was found in southern Indian population [8]. Caucasian population had higher occurrence of Carabelli trait than Mongoloids [6].

Based on the available studies [Table/Fig-4] [6,8-16], the occurrence of prominent cusp of Carabelli in primary dentition is low in Asian population when considering the permanent dentition. Hence, occurrence of a definite cusp of Carabelli on the primary maxillary second molar was relatively infrequent.

## CONCLUSION

Morphological variations like accessory cusps are common in primary and permanent dentition. Presence of cusp of Carabelli in primary dentition is a rare phenomenon. They are either unnoticed or not reported. Clinically, they may not have much importance but are important from forensic point of view. Presence of such anomalies may lead to dental problems hence proper guidance and treatment should be carried out.

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