

# Bilateral Multiple Accessory Cusps on Third Maxillary Molars - A Rare Finding

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**Received date:** May 29, 2024, **Accepted date:** June 11, 2024, **Published date:** June 30, 2024.

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## Abstract

Accessory cusp is an anomaly that can be a variation of normal like the Cusp of Carabelli especially seen in the palatal aspect of maxillary first molar, or it can be a rare finding in a different region of different tooth like Dens evaginatus (DE) in premolars. Its presence is commonly identified by dental healthcare professionals clinically and seldom self-reported by the patients. Although it is usually asymptomatic, the presence of these structures can be a cause of concern particularly when they interfere with occlusion, causing trauma on the underlying pulpal horn and eventually lead to the early pulpal necrosis of the tooth or even fracture of the tooth. If accentuated, these cusps can present with deep fissures causing food lodgement, and eventually dental caries.

This case report presents an unusual case of a 29-year-old female patient with bilateral multiple accessory cusps in both her permanent maxillary third molars, the left (tooth 28) with additional two palatal cusps and one distal cusp (7-cusp anatomy) and the right (tooth 18) with additional two palatal cusps (6-cusps anatomy). They were asymptomatic and there was no sign of attrition of both teeth. Radiographic investigation did not reveal any pulpal extension in both teeth. The early identification can avoid pulpal complications and further caries development or progression due to deep fissures associated with the accessory cusps.

## Introduction

Typical changes in tooth morphology that are occasionally identified clinically are known as accessory cusp [1]. The molar cusp of Carabelli, incisors talon cusps, and premolar Leong's tubercle are the accessory cusps that have been most extensively documented in both permanent and deciduous dentition. There isn't much research that discusses how various group populations and third molar differ from one another. However, variations in crown morphology of the third molar have rarely been reported. Therefore, we are here reporting a rare case of two fully erupted maxillary third molar with multiple accessory cusps [1].

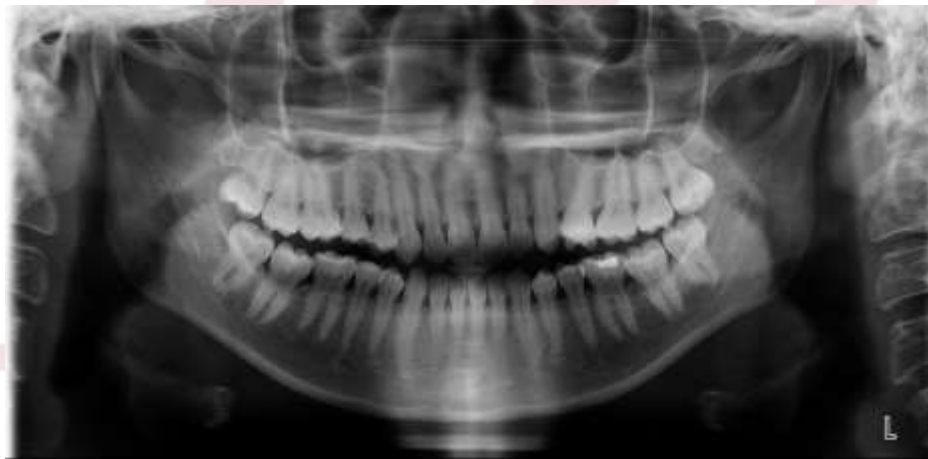
## Case Report

A 29-year-old Malay female patient came to the student polyclinic of Manipal University College Malaysia for a routine dental checkup. She presented with fair oral hygiene and gingival recession mostly in the premolar regions due to improper tooth brushing. She was in good health condition with no reported medical illness. Upon extraoral examination, the patient had difficulty in mouth opening occasionally and was unable to keep her mouth open for more than 15 minutes. However, there was no history of lock jaw. A provisional diagnosis of Anterior Disc displacement with reduction was given.

Clinical Intraoral examination shows her right and left maxillary third molar with a rare cuspal morphological variant. Tooth 18 (Figure 1.0) has four main cusps with two accessory cusps located palatal to the main cusps that have a deep fissure, separating the accessory cusps from the main cusps. Tooth 28 (Figure 2.0) has four cusps with two palatally placed accessory cusps and one additional distal cusp, resembling the shape of a flower. The accessory cusps seen on tooth 28 were more accentuated in size compared to the ones seen on tooth 18. The cusps of teeth 18 and 28 were not attrited. A significant malocclusion is considered as a pseudo transposition of teeth 24 and 25 (figure 2.0). It is uncommon yet unique to locate a well-defined Cusp of Carabelli concerning tooth 16 (Figure 1.0).

Panoramic radiograph (Figure 3.0) showed multiple cusps on teeth 18 and 28 with fully formed roots; two roots in relation to tooth 18 and one fused root in relation to tooth 28. The radiographic investigation also reveals no pulpal horns extending into the accessory cusps. Gross scaling and polishing were done, along with fissurotomy on tooth 18 performed as a prophylactic measure. Management of the patient's Temporomandibular disorder (TMD) was limited to homecare instructions like hot water fomentation, soft diet, and restriction of mouth opening. The patient was also advised to seek orthodontic consultation regarding malocclusion related to the pseudo transposed teeth 24 and 25.



**Figure 1.0****Figure 2.0****Figure 3.0**

### Discussion

Third molars in general depict more aberrations in their development than any other teeth [2]. They are the last to appear in the permanent dentition] and clinically, they seldom look well-developed [2] [3]. The predominating design when viewed occlusally is a heart shape; three functional cusps (two buccal and one lingual)

of maxillary molar are seen, exclusive of a distolingual cusp which is very small, non-functional, and may be absent [2].

In contrast, in this case report, the upper maxillary third molars on both sides show a rare yet unique shape that resembles a flower: tooth 28 presented with accessory cusps (two cusps palatally and 1 cusp distally);

tooth 18 presented with two accessory palatal cusps. The additional cusps seen on tooth 18 were less accentuated than the ones concerning tooth 28.

Gemination is a condition wherein the tooth is more enlarged and appears to be joined in which the tooth count is normal [4]. On the other hand, fusion also appears clinically similar to gemination but with reduced tooth count [4]. Some studies have shown in permanent dentition, this condition has a stronger predilection for the Asian population (more than 5%) compared with the whites (0.3% to 0.5%), bilateral cases are infrequent [4]. This case report involves the unusual appearance of third molars (accessory cusps located palatally); hence it is difficult to identify if gemination or fusion took place unless the tooth is examined *ex vivo*. There is a chance that it may be due to the fusion with an adjacent distomolar [5]. Distomolar is characterized by an unusual additional tooth arising distal to the third molar. In a retrospective study in Okayama, Japan, conducted by Bangbose et al, the appearance of a fourth molar or distomolar is more commonly seen in the maxilla but rare among the Japanese population (0.32%) [6].

Panoramic radiography that was taken only provides two-dimensional imaging, so image overlapping can happen. Although the image is not of high quality, the radiographic investigation doesn't show multi-rooted structures associated with the accessory cusps, since they are located palatally.

Accessory cusps depict minor variations of cuspal morphology. It has a few distinctive patterns in which two of them will be further discussed, Cusp of Carabelli and Dens evaginatus.

The cusp of Carabelli is located on the palatal surface of the mesiolingual cusp of the maxillary molar. This cusp is usually more accentuated on the first molar and it gets increasingly less conspicuous on the second and third molar. Prevalence of this variation is reported to be high in the white population (about 90%) but rare in the Asian population [4]. The cusp of carabelli is unlikely but may have a pulpal horn [7].

Studies have shown this pattern to be a hereditary trait. Earlier studies proposed homozygosity of a gene is responsible for a pronounced tubercle and heterozygote only shows slight grooves, pits, tubercles, or bulges [8]. Later studies added other multiple genes responsible for the development of this trait [8]. Current evidence has revealed that gene expression and gene mutation during different stages of tooth development can affect the development and shape of tooth morphology [9] [10]. The genetic aetiology of the Cusp of Carabelli suggests that the genes PAX and MSX genes are responsible [11]. Yet, the exact cause of supernumerary cusp development and aberrant tooth morphology remains unknown [1].

Dens evaginatus (DE) has many other interchangeable terms such as central cusp, central tubercle, tuberculated cusp, occlusal pearl, and evaginated odontome. Depending on the location, it can be called as Leong's premolar concerning premolars or Talon's cusp on anterior teeth. According to Kocsis et al, DE is characterized by a supernumerary macrostructure of the tooth surface, representing a cusp formation on the occlusal surface of premolars and molars, and the lingual surface of canines and incisor teeth [12]. DE occurs most commonly in Asian descent with the mandibular second premolar being the most commonly involved tooth [13].

Dens evaginatus may be the least probable differential diagnosis for this case report due to the lack of resemblance of an accessory cusp emerging from the central groove. Unlike the Cusp of Carabelli, DE often involves additional pulpal horns into its accessory cusp [4]. This has a clinical significance as it can lead to pulpal necrosis over some time.

The provisional risk of pulpal necrosis was negligible as there were no signs of attrition. Attrition can lead to a fracture of the cusp that makes the tooth non-vital [1]. However, these additional cusps usually present with many supplemental and accidental grooves unless the tooth is attrited [2]. Tooth 18 (figure 2) has a deep developmental fissure running mesiodistally between the

palatal accessory cusps and the main cusps. This poses an additional challenge for retaining the tooth free of caries. Henceforth, patient education on caries risk and the importance of maintenance of oral hygiene (especially in hard-to-reach areas like the third molars), must be ensured.

A dental trait in humans can be a valuable diagnostic tool in anthropological studies for classifying and characterizing different ethnic groups [14]. This knowledge sought to be an additional aid in the field of forensics via dental identification, especially as a disaster victim identification protocol [15].

DE is more commonly seen in Asians, Inuit, and Native Americans [4]. In the Asian population, DE is commonly related to the mandibular second premolar [1]. The cusp of Carabelli is commonly seen in Caucasians [16]. Metaconules, defined as accessory cusp located at the distal border of maxillary molars, is a frequent feature related to deciduous maxillary second molars of mongoloid population [17].

### Limitations

Due to underlying Temporal Mandibular Joint Disorder (TMD), the patient was unable to keep her mouth open for long. This factor contributed to the difficulty in obtaining good intraoral periapical radiographs and more supporting intraoral photographs.

A panoramic radiograph was taken instead to assess the pulpal anatomy and root morphology of the teeth in question. Although root morphology was assessed, higher-quality radiography like CBCT was preferred to confirm the absence of any apical and pulpal variations.

### Conclusion

Additional research is needed to document more of

the same findings. The prevalence and distribution of this particular variation of the maxillary third molar is under-reported, thus creating a gap in research for a comprehensive systematic review.

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