

# Multiple Accessory Cusps Expression at Mandibular Third Molar: A Unique Variation of Dental Crown Morphology - A Case Report

Nur Lyanna Mahfuzah Mohamad Johar<sup>1</sup>, Yy Jean Tan<sup>2</sup>

**Keywords:** Mandibular third molar, Gemination, Variance morphology

## ABSTRACT

Accessory cusps are occasional variations in tooth morphology that can be detected clinically. Third molars have a wide range of eruption patterns and shapes but are commonly impacted. Unlike root morphology, variations in the crown morphology of the third molar have rarely been reported. Variations in crown morphology are important because they can affect clinical outcomes. Here, we present a rare case of fully erupted mandibular third molar (MTM) with multiple accessory cusps. This case report describes a case of a 31-year-old female Kenyah with a unique crown morphology of her fully erupted, vital, and functional mandibular third molar (MTM) which has multiple accessory cusps seen on the buccal surface, giving the appearance of a double tooth. Her MTM presented with an incipient caries lesion, which was managed conservatively. Documenting variations in tooth morphology is crucial for individual identification. While most people opt to have their MTMs extracted, early management of well-erupted and functional teeth should be undertaken to prevent disease progression.

## INTRODUCTION

Accessory cusps are typical variations in tooth morphology that are detected clinically on occasion [1]. The most widely described accessory cusps in both permanent and deciduous dentition are the molar cusp of carrabelli, incisor talons cusps, and premolar leong's tubercle. The prevalence of these variations varies depending on the type, ranging from 0.06 % to 40.8 % for the Talon cusp [2], 90.6% for the Carabelli cusp [3], and 4.08% for the Leong's tubercle [4]. The third molar, also known as the wisdom tooth, is generally the last tooth to erupt at the age range of 17 to 26 years [5]. Understanding the morphology of each tooth including the third molar is important as it may have both clinical and forensic significance. Few studies have reported the differences in root morphology of the third molar among different group populations [6,7]. However, variations in crown morphology of the third molar have rarely been reported. Variation in

crown morphology may be related to an increased number of roots, which can affect clinical outcomes during endodontic therapy, periodontal care, extraction, tooth preparation for restorative treatment, and orthodontic treatment of such teeth [8,9]. Therefore, we are here reporting a rare case of fully erupted mandibular third molar (MTM) expressed with multiple accessory cusps.

## CASE REPORT

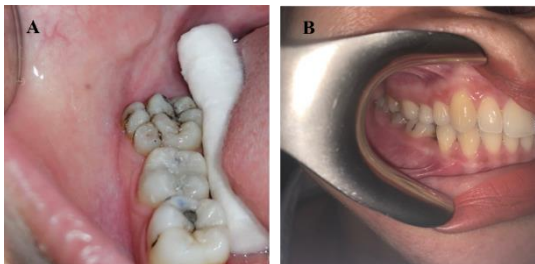
A 31-year-old female Kenyah came to the Primary Dental Care in Sarawak, Malaysia to restore her anterior tooth. She presented with multiple restorations, carious lesions, and fair oral hygiene. She is medically fit but a non-regular dental attendee. The patient was grouped in a high-risk caries category. While examining intra-orally, her right MTM (48) was noted to have fully erupted with a bizarre morphological variant (Figure 1A). This tooth has 2 buccal cusps with additional 3 accessory buccal cusps fused at the buccal wall and 3 lingual cusps. There was caries on the occlusal fissure as well as the fissure formed from the extra buccal cusps. The fissure was discoloured and soft in consistency upon probing. There was no enamel

<sup>1</sup>Kota Samarahan Dental Clinic, Kota Samarahan, Sarawak, Malaysia

<sup>2</sup>Department of Oral and Maxillofacial Surgery, Dental Specialist Clinic, Sarawak General Hospital, Kuching, Sarawak, Malaysia

\*Correspondence: lyanna1909@gmail.com

breakdown seen. The tooth is asymptomatic, vital, and in occlusion with the opposing tooth in maximum intercuspation (Figure 1B). An intra-oral periapical radiograph (IOPAR) showed multiple cusps and a bulbous crown of tooth 48 with fully formed and fused roots (Figure 2). A provisional diagnosis of gemination with a differential diagnosis of fusion with a supernumerary tooth was made for this tooth. Another corresponding left MTM (38) appears to have the usual morphology resembling the shape of the first and second mandibular molar (Figure 3). Since the carious was detected early in this tooth (48), conservative restorative management was decided. Caries have the potential to spread deeper if it was not managed early. A fluoride-containing fissure sealant (Conseal F) was done to seal the fissure and prevent ingress of bacteria thus stopping the disease progression. Oral hygiene reinforcement, a few restorations, and scaling were done to complete the treatment plan. She was on a periodic recall every six months and the sealant was still intact with no evidence of cusp fracture.



**Figure 1** Intra-oral photograph show (A) mandibular right third molar (48) appeared like a double tooth presented with occlusal fissure carious lesion and (B) a functioning mandibular right third molar in occlusion with the maxillary right second molar (17) in maximum intercuspation position.



**Figure 2** Intra-oral periapical radiograph shows multiple cusps and bulbous crown of mandibular right third molar (48). Roots seen fully formed and fused together.



**Figure 3** Intra-oral photograph shows mandibular left third molar (38) with usual occlusal morphology resembling the shape of first and second mandibular molar. Fissure sealant was applied on her mandibular right third molar (48) to seal and stop the disease progression.

### DISCUSSION

The development of third molars has been used to determine chronological age [10,11]. The third molar is particularly interesting because it is the last dentition and tooth with the most variation [12]. Developmental stages of the third molar are strongly correlated to the age of the subject [13]. The average age of mandibular third molar crypt formation was 8 or 9 years, with a wide range of 6 to 14 years [14]. By the age of 8, individuals' third molars began to calcify. The 9th year has been regularly reported as the mean age of the cusp tips' first mineralization [14]. Greater diversity was seen in the mean age of reaching crown completion between different populations, ranging from 14 years to 22 years [15-17]. On the other hand, the apical ends of the MTMs were completely closed at around 22 years [13,16,17]. The exact cause of supernumerary cusp development or aberrant tooth morphology is unknown. Current evidence has revealed that gene expression and gene mutation acting at various stages of tooth development play an important role in the development and shape of tooth morphology [18, 19].

Most of the time there are 4 third molars seen in individuals (2 in the maxilla and 2 in the mandible bilaterally) [20]. However, it is also reported as the most frequently impacted tooth with a frequency of occurrence ranging from 18% to 32% [21]. But in some cases, it erupts normally without abnormality. As such, this is seen in this reported case for both of her MTM. These factors depend on the tooth size, pattern of jaw size as well as facial growth of an individual which is believed to differ among each population, race, and gender [22].

Although the crown of MTM may exhibit greater variance in size and shape like no other tooth in the oral cavity, its crown usually resembles a four-cusped mandibular second molar or a five-cusped mandibular first molar. This is seen in her other corresponding MTM.

Extra cusps or roots presented on the third molar can make the appearance unusual. It may be due to fusion with adjacent extra (fourth) or distomolar [23]. It is called so due to its distal location to the third molar. In this case report, the extra cusps are located buccally instead of distally. In a retrospective study done in an Asian country, it was found that the fourth molar prevalence is infrequent (0.32%) and more commonly seen in the maxilla [24]. Another study found that the MTM gemination appeared like two crown structures were fused with a single bulbous radicular portion [25]. It is very difficult to differentiate between gemination and fusion clinically unless the tooth is extracted and examined directly. In this case report, the roots seem to be fused from IOPAR but it may fail to demonstrate a multi-root structure since the extra cusps were joined at the buccal site. Panoramic radiography provides two-dimensional imaging, so there is often image overlapping.

Accessory cusps on the affected tooth can also be classified as developmental aberration known as Dens Evaginatus (DE). The morphology has been described as an extra cusp or cusp-like structure arising from the occlusal surface of posterior teeth, lingual surface, or rarely the facial surface of anterior teeth [26]. DE occurs most commonly in Asian descent with the mandibular second premolar being the most commonly involved tooth [4]. However, in this case, multiple extra cusps shaped like another molar tooth are seen emerging from the buccal surface of MTM. The distinct MTM pattern identified maybe exclusive to this minority ethnic group, as no prior cases have been reported. Additional research in the future is necessary to document this uncommon MTM pattern in relation to this specific population.

Accessory cusp might form during the bell stage of tooth formation whereby, there is an alteration or abnormality in the proliferation and folding of the inner portion of the enamel epithelium and subjacent ectomesenchymal cells of the dental papilla into stellate reticulum of the enamel organ. This will result in the formation of supplemental solid elevation on the crown surface [27,28].

It is important to accept the concept of morphological variability in a functional, aesthetic, and statistical sense. It is well known that no two individuals have an identical dentition. Every detail may differ among each population and gender of an individual. Thus, it is crucial to record it during dental charting. Dental identification can be used for disaster victim identification protocol in forensics [29]. A dental trait in humans can be a valuable diagnostic tool in anthropological studies for classifying and characterizing different ethnic groups [30].

The dental health of third molars is more difficult to maintain than other teeth. This tooth is the least accessible with dental care due to its placement. The incidence of caries is greater due to that fact. Hence this tooth is difficult to restore if caries happen [20]. In this case, since the crown morphology is complex, we decided to do minimal conservative management to prevent the spread of caries. Since this tooth is also occluding with the opposing tooth in the intercusp position, attrition might occur on the extra cusps followed by fracture and becoming non-vital. Therefore, regular follow-up is required. Waiting for the pain to appear before examining and treating illness around the third molars causes the disease to spread, potentially leading to tooth loss or even life-threatening infection [20]. Therefore, early detection and management can help prevent the disease from progressing.

## **CONCLUSION**

Authors report a never-before-described clinical finding of multiple accessory cusps seen at the buccal surface of MTM, the rarest of its kind. Documentation of the morphological variance helps in patient education, management, and forensic recognition. To avoid complications, early detection, and management are important. Further investigation is required to determine the cause and factors regarding the morphology of the third molar in this population group.

## **ACKNOWLEDGEMENT**

The authors would like to thank Dr Thaddius Herman Maling for his guidance in preparing this case report.

## **DECLARATION OF INTEREST**

Authors declare no conflict of interest

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#### **Editorial History**

Date of Submission: 15 Oct 2022

Review & Revision: 18 Nov 2022 – 17 Mar 2023

Accepted: 22 Mar 2023

Published: 28 June 2023

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