

Case Report: Endodontic Therapy of a Maxillary 2nd Molar with a Supernumerary Cusp

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INTRODUCTION

- In rare cases there can be an additional cusp on the buccal surface of posterior teeth, and there are a number of ways to name and classify these supernumerary cusps (TABLE 1). These cusps can be composed of primarily enamel or contain enamel, dentin, and pulp tissue. These additional cusps or tubercles can vary in size, sometimes making them hard to clean and more prone to caries development and possibly periodontal disease¹⁻⁴.
- During tooth development, signaling centers in the epithelium called enamel knots work with adjacent mesenchymal signals to determine the pattern of cusps and the shape of the clinical crown^{1, 10-12}.
- The primary enamel knot creates the occlusal scheme for molars and premolars, and secondary enamel knots form specific cusps during amelogenesis. It is thought that the presence of additional cusps is caused by accessory enamel knots. Location and interrelationships of the cusps seem to be in part genetically determined^{1,10-12}
- In this case report, we discuss clinical implications of supernumerary cusps by describing a case where root canal therapy was performed on a maxillary molar with a buccal supernumerary cusp and the utility that CBCT can have in these cases.

TABLE 1. Naming Convention for Accessory Cusps and Location on Posterior Teeth

Author (Year)	Accessory cusp and location
Bolk (1916)	Paramolar tubercle: buccal cusp of maxillary and mandibular succedaneous molars
Dahlberg (1945)	Protostylid: cusp on buccal surface mandibular molars Parastyle: cusp on buccal surface of maxillary molars
Dahlberg (1950)	Paramolar: cusp on buccal or lingual surface of maxillary and mandibular premolars and molars

CASE DESCRIPTION

- HPI:**
- A 19-yo-male presented with a chief complaint of constant low-grade pain (3/10) in the upper right teeth that had worsened to 7/10 and interrupted his sleep. He reported no thermal sensitivity.
- Past medical history and review of systems were noncontributory. The pt elected to take no pain medication.
- CLINICAL EXAM:**
- Substantial amount of additional tooth structure was located on the mesiobuccal cusp of the maxillary 2nd molar, #2 (FIGURE 1) with secondary caries beneath a sealant separating the buccal groove from the accessory cusp on the buccal surface.

DIAGNOSTIC TESTING
No trauma history
No recent dental treatment
No percussion sensitivity
No probing depths >3mm
No swelling or sinus tract
No palpation tenderness
No mobility
Lingering Response to Cold Testing >30s
Responsive to EPT

RADIOGRAPHIC EXAM

- Demonstrates caries on #2 facial and likely secondary caries beneath the occlusal amalgam as well as secondary caries beneath #31-occlusal amalgam (FIGURES 2-3)

DIAGNOSIS: #2 Symptomatic Irreversible Pulpitis with Normal Apical Tissues

CLINICAL COURSE

- Findings were described to the patient and he consented to caries excavation with plan to begin RCT #2. Recurrent caries was present beneath the existing occlusal amalgam and communicating with the carious dentin from the paramolar cusp. Complete caries excavation led into the pulp chamber and RCT on #2 was initiated. The patient was then appointed with an endodontist for completion of the RCT.

- A CBCT was taken on #2 to demonstrate the root canal anatomy and guide treatment (FIGURES 4-6). The radiopaque material in the canals of #2 is a component of the calcium hydroxide paste. Some scattering can be seen from the amalgam present on #31 (FIGURE 5).
- Clinical evaluation of the chamber floor revealed 3 canal orifices, 2 buccally and 1 palatally (FIGURE 6). The final working lengths and canal sizes were for MB (18mm to size 35), DB (20mm to size 35), P (20mm to size 45). Frequent irrigation (8.25% sodium hypochlorite and 17% EDTA) was performed. The canals were dried and obturated (Roth sealer, gutta percha, FIGURE 8).

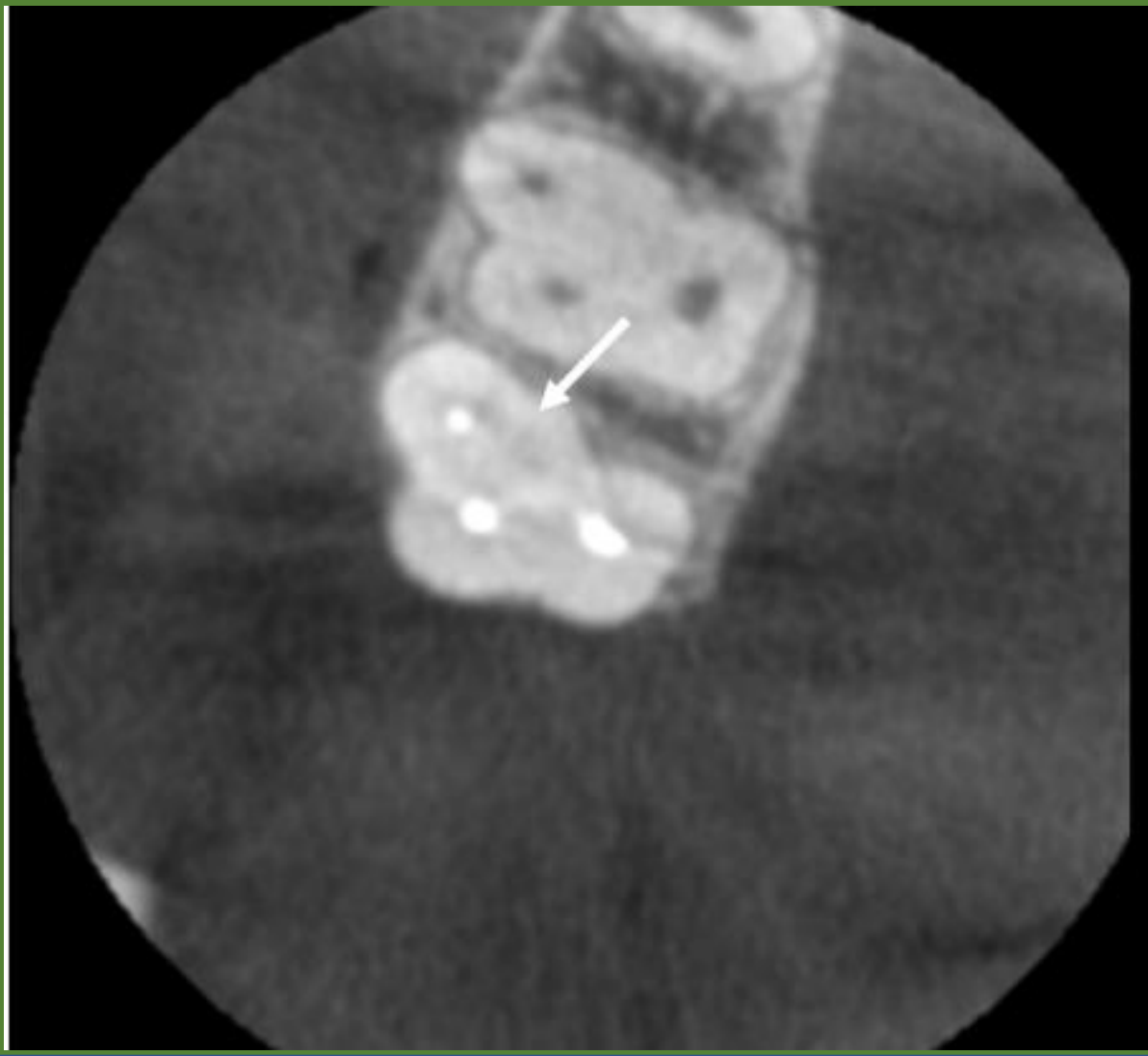


FIGURE 6. CBCT axial view shows lack of distinct mesio-palatal canal (white arrow). The presence of a mesio-palatal canal in a 2nd maxillary molar can vary widely, from as low as 20% to as high as 94%^{14, 15}



FIGURE 1. Pre-operative photograph demonstrating paramolar cusp (white arrow) on #2 (mirror image)



FIGURE 3. Periapical radiograph demonstrates soft tissue impacted #1 and no periapical pathology #2



FIGURE 5. CBCT coronal view of #2/31 illustrating mucosal thickening present on R maxillary sinus

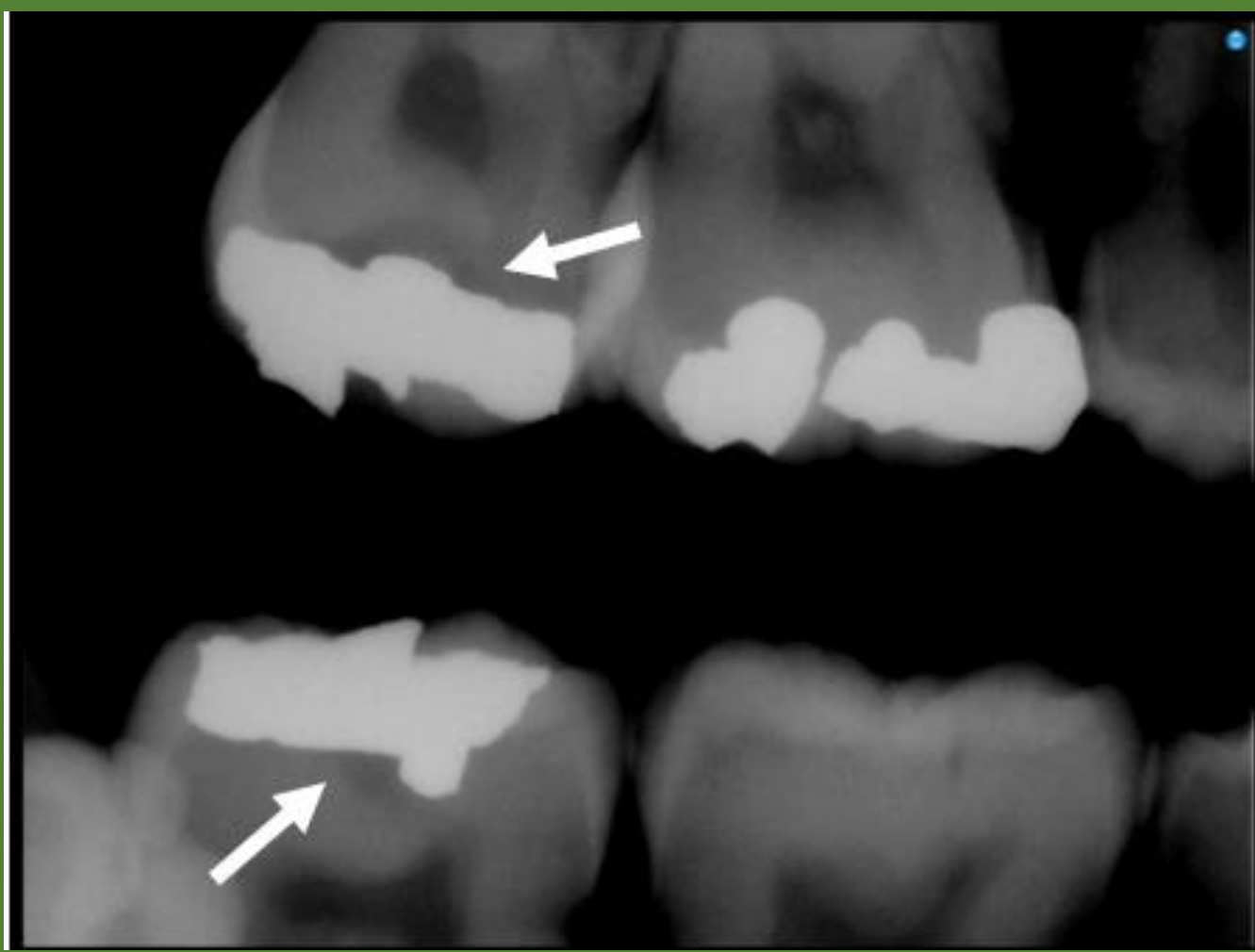


FIGURE 2. Bitewing radiograph showing facial caries on #2 with possible secondary caries on #2 and secondary caries on #31-occlusal (white arrows)

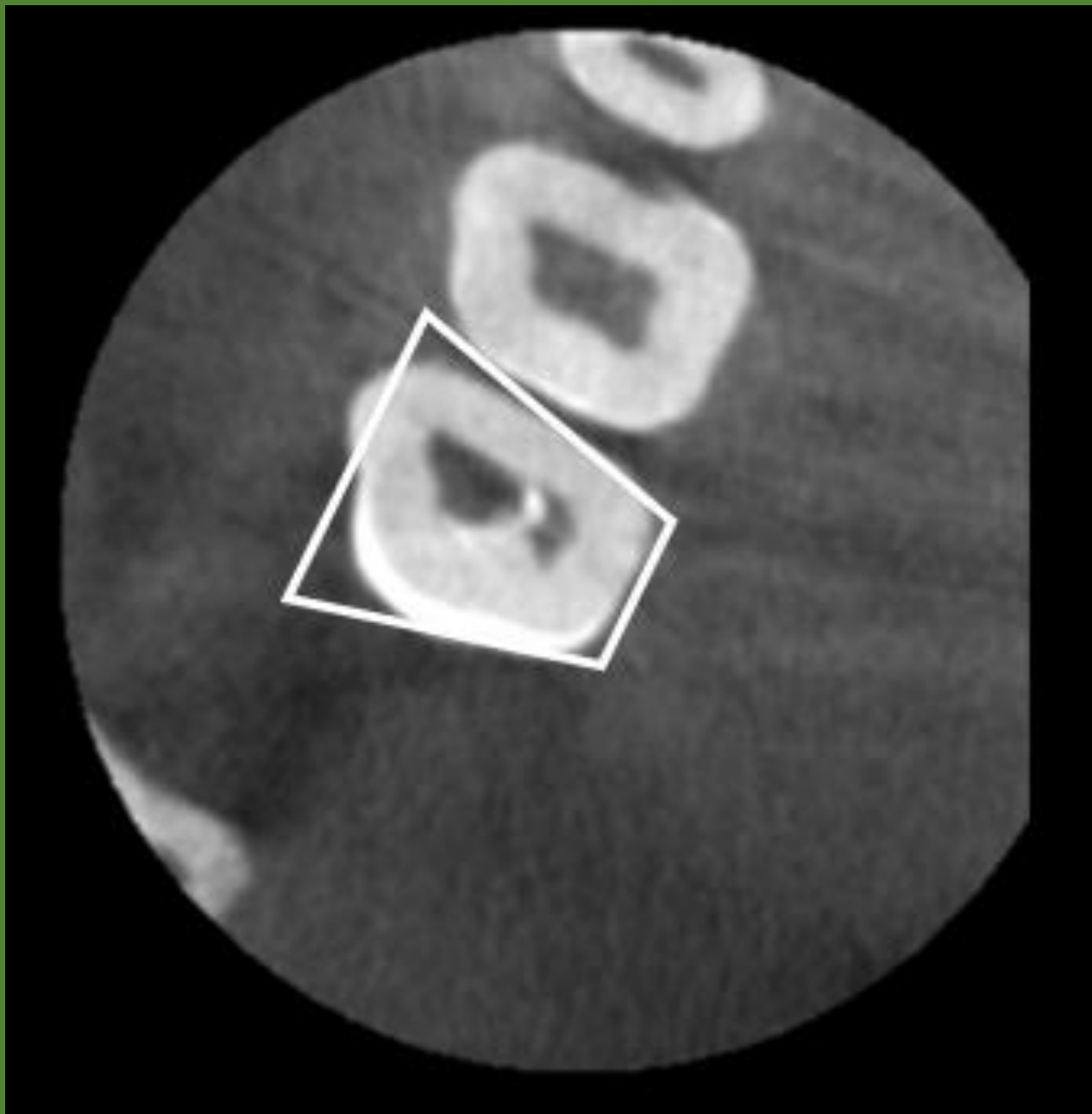


FIGURE 4. The walls of the pulp chamber can be seen extending toward the supernumerary cusp located on the mesiobuccal cusp, following the outline of the tooth at the cementoenamel junction (CEJ) as described in the Law of Concentricity⁸

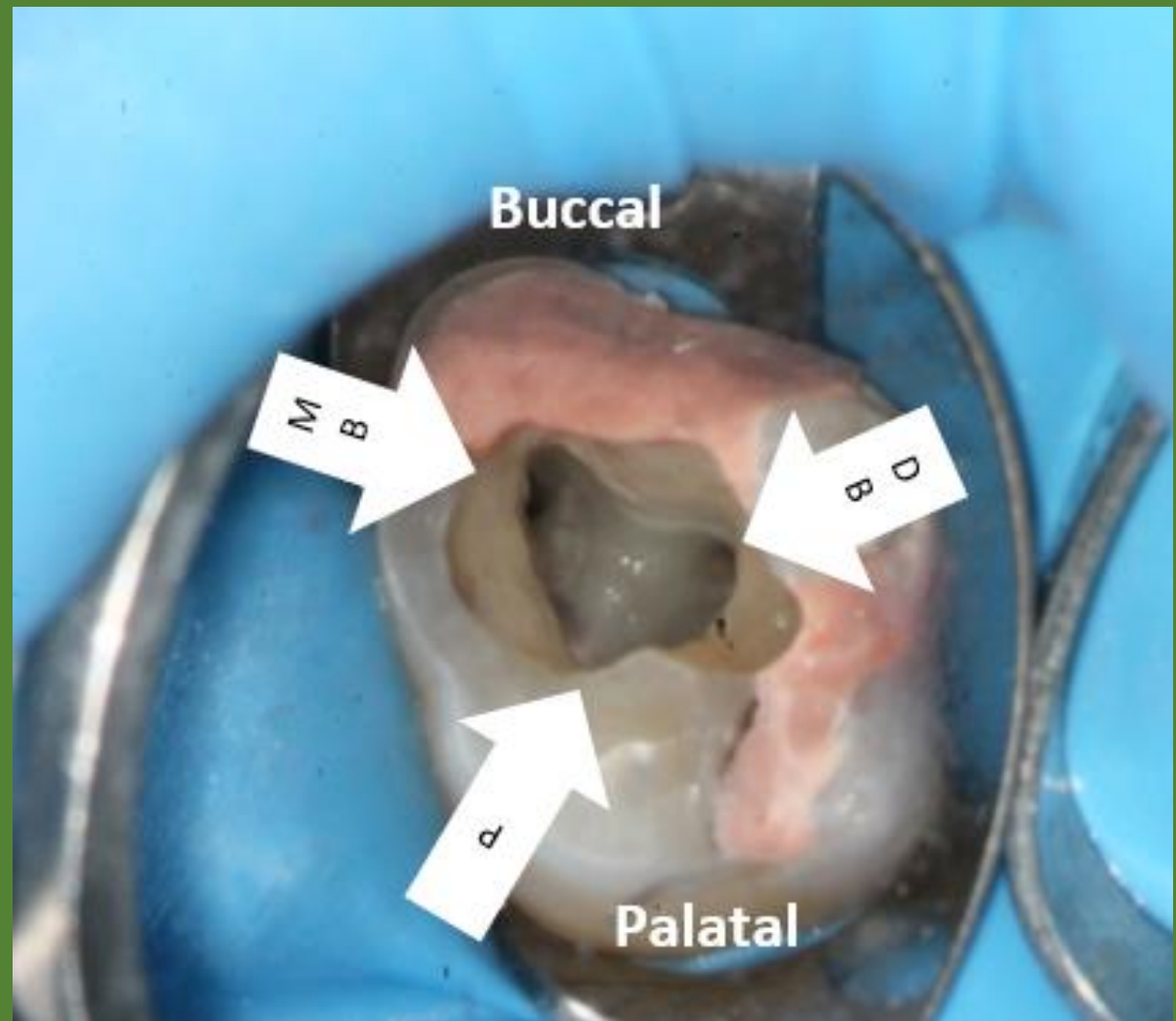


FIGURE 7. Intra-operative view of 3 canal orifices: 2 buccally and 1 palatally (mirror image)



FIGURE 8. The post-operative periapical radiograph shows the completed root canal therapy of #2 with adequate length, fill, taper, and apical preparation size as well as an artifact from the Extension Cone Paralleling Instrument (XCP)

CASE CONCLUSION

Recognizing and understanding some of the particular challenges associated with caring for teeth with accessory cusps is valuable across multiple disciplines. These teeth can be susceptible to caries, gingival inflammation, gingival recession, and periodontal disease, and can complicate prosthodontic, orthodontic, and endodontic procedures. CBCT has been a demonstrated adjunct in performing RCT on teeth with supernumerary cusps and helps to ensure complete cleaning of the root canal space^{5-6, 9}. We recommend informing the patient of the paramolar cusp and emphasizing the importance of good oral hygiene in the area as well as the placement of sealants when warranted. Routine exams and prophylaxis are also instrumental in these cases for early identification of the beginning of any disease process.

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