

Case Report

A Three-rooted Deciduous Second Molar in a 13-year-old Caucasian Female

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Abstract

Introduction: Several reports have been published highlighting accessory root formation in permanent molars. These studies have shown higher incidence of occurrence of accessory roots in patients of Mongolian, Taiwanese, Korean, Inuit, Native American and Indian descent. Very few reports have been published with a focus on accessory root formation in the primary dentition, in particular in the Caucasian population. **Objective:** This study was aimed at drawing attention to a rare morphological development in the Caucasian population. **Case Presentation:** This report presents a case of a 13-year-old Caucasian female with a three-rooted mandibular second molar tooth #T. The tooth was surgically removed, with some degree of difficulty, and upon inspection of the tooth following removal, it was observed that an accessory root was present. **Conclusions:** The presence of an accessory root may be demonstrated radiographically, but often is only discovered after excavation of the pulp chamber or following removal of the tooth itself. As such, it is important for the astute clinician to consider the potential for the presence of an accessory root, and to appreciate the potential complications an accessory may cause during endodontic or surgical treatment. Appropriate imaging should be obtained preoperatively if an accessory root is suspected, and treatment planning should be adjusted accordingly, in order to optimize successful treatment.

Keywords

Accessory Root, Caucasian, Mandibular Primary Molar, Endodontic Therapy, Surgical Removal

1. Introduction

Several reports have been published highlighting accessory root formation in permanent molars. These studies have shown higher incidence of occurrence in patients of Mongolian descent [1], specifically Taiwanese [2], Korean [3], Inuit [4], Native American [5] and Indian [6]. One report published in 1982 demonstrated a three-rooted three-rooted mandibular first molar extracted from a 5 year old Caucasian male, with the accessory root noted to have been located distolingually

[7]. Given this report, very few reports have been published with a focus on deciduous dentition and fewer present a case of accessory root formation in a Caucasian patient.

The presence of an accessory root may be demonstrated radiographically but often it is only discovered after excavation of the pulp chamber or during and after extraction. As such, it is important for the astute clinician to consider the potential for the presence an accessory root, and to appreciate

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the potential complications an accessory root may cause during endodontic or surgical intervention. Nevertheless, the implementation of enhanced imaging methods, including cone beam computed tomography (CBCT) has enabled a high degree of sensitivity and specificity in the evolution of surgical and endodontic therapy [8]. Additionally, this technology has evolved as an adjunct and/or replacement for conventional two dimensional imaging in pediatric dentistry [9].

This report presents a case of a 13 year old Caucasian female with a three rooted deciduous mandibular second molar tooth T. This purpose of this case report is to draw attention to a rare morphological development in the Caucasian population.

2. Case Report

A 13 year old Caucasian female presented for removal of retained tooth T, having been referred for this procedure by her orthodontist. Clinical examination demonstrated healthy 13 year old female, with a mixed dentition in stable condition. Tooth T was noted to be present, with no clinical or radiographic evidence suggestive of accessory root formation (Figure 1).



Figure 1. Panoramic radiographic evaluation of tooth T demonstrating no readily observable evidence of accessory root formation.

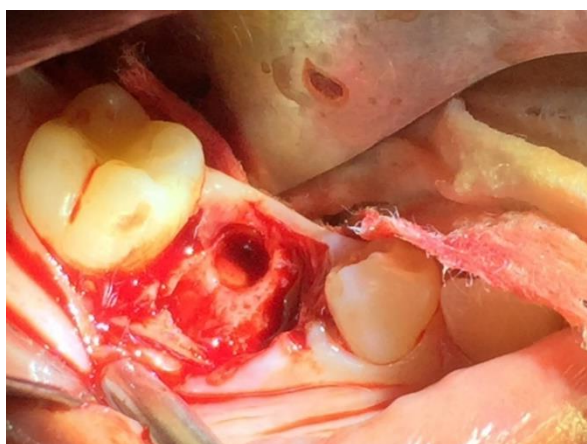


Figure 2. Extraction socket from tooth T, confirming position of accessory root in the distolingual position.

Subsequently, tooth T was removed as treatment planned, in atraumatic fashion, but with some degree of difficulty, in particular due to the expected accentuated curvature typically present in the primary molar dentition. As such, appropriate mucoperiosteal flap development, combined with the judicious use of dental elevators and extraction forceps was employed, in order to minimize the possibility of root or alveolar bone fracture. Upon removal of the tooth, it was clearly apparent that the tooth demonstrated an accessory distolingual root. Inspection of the extraction socket was performed, and confirmed the presence of the accessory root having been located in a distal lingual position (Figure 2). Photographs of the extracted tooth demonstrate the unique nature of the morphology of this tooth, in particular with respect to the accessory distolingual root (Figure 3).

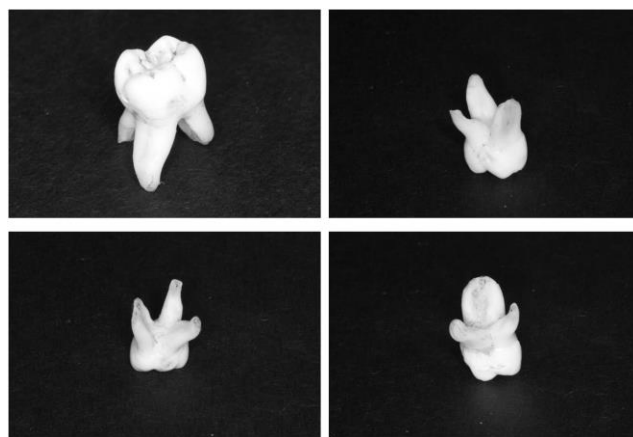


Figure 3. Tooth T viewed from differing aspects following extraction, with accessory distolingual root.

3. Discussion

Deciduous mandibular second molars (K and T) typically present with two roots, one located mesially and one distally. These teeth often closely resemble the permanent mandibular first molars in crown and root morphology [10]. Accessory roots form similarly to other roots, by an apical proliferation of the epithelial root sheath [11].

The formation of an accessory root is typically considered a variation on the normal tooth anatomy but is not considered pathological [12]. Goldberg discusses in detail the genetic abnormalities that may contribute to defective root structures, noting that alteration of a chloride channel and/or defective plasminogen gene are linked to local alterations in root formation [13]. As aforementioned, accessory roots have been reported in greater frequency in those of Mongolian descent. Tu et al analyzed mandibular first molars using CBCT imaging and found that of the 123 patients screened 33% demonstrated an accessory root [2]. Additionally, in a well written literature review by Ahmed et al it was determined that the frequency of maxillary molars with four roots was

found to be 0.9%, 1.4% and up to 7% in first, second and third molars respectively.

The research published relative to accessory root formation in primary teeth is more limited. Song et al studied a Korean population and found that out of 4,871 primary mandibular first molars 471 of these (9.7%) demonstrated accessory root formation. Of 5,210 primary mandibular second molars 1,450 (27.8%) demonstrated accessory roots. In a case report published by Rana et al, a 10 year old male Indian patient presented for an extraction of tooth T, it was determined through intraoral periapical radiography and later extraoral clinical examination that an additional root was present in the mesial lingual area [14]. Very few reports have been published focusing on accessory roots in deciduous teeth of Caucasian children. As noted in the introduction, Badger demonstrated a three-rooted mandibular first molar extracted from a 5 year old Caucasian male. The additional root was shown to be located in the distolingual (DL) area, and he further discussed the fact that the accessory DL root has a predilection towards the right side, and that the existence of a DL root was associated with larger coronal buccolingual dimensions [7]. Additionally with respect to associated coronal abnormalities, Andytan et al present presented a case of an accessory cusp being present on bilateral mandibular deciduous first molars in a 6-year-old male [15]. With respect to the rarity of an accessory root in the in the Caucasian population, this would appear to be the result of genetic factors, with possible epigenetic influences, and presents a unique opportunity for further research.

4. Conclusion

The present case report discusses a deciduous second molar (tooth T) with an accessory root, discovered upon extraction. This is significant because it confirms the possibility of accessory primary roots in the Caucasian population. The occurrence of such accessory roots can impact treatment in endodontic therapy and surgical removal. In particular, the canal of an accessory root canal may be missed during endodontic treatment, or a portion of a fractured root may be left in situ, both of which might result in adverse sequelae. As such, it is strongly recommended that if accessory root(s) are suspected upon presentation, additional imaging modalities should be considered, including cone beam computed tomography (CBCT) scanning and periapical radiography, in order to aid in diagnosis and treatment planning. Additionally, the presence of an unrecognized accessory root can significantly increase the difficulty of endodontic therapy, including pulpotomy/pulpectomy, or surgical removal. The astute clinician should keep in mind the potential accessory root formation, even in the face of clinical and radiographic findings that may not suggest the presence of accessory root formation.

Abbreviations

CBCT	Cone Beam Computed Tomography
DL	Distolingual

Author Contributions

Daniel Joseph Traub: Funding acquisition, Resources, Software

Robert Walsh: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Project administration, Resources, Software, Supervision, Validation, Visualization

Colleen Ahern: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Project administration, Resources, Supervision, Validation, Visualization

Conflicts of Interest

The authors declare no conflict of interest.

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