Endodontic Management by Cone Beam Computed Tomography and Vista scan of Maxillary Second Molar with Parastyle - A Case report

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Abstract

Thorough knowledge of the root canal anatomy and its complexities is essential to provide successful root canal treatment. Variations in tooth form and anatomy may be found in the form of anomalous cusps or additional roots. In permanent molars, changes in the tooth morphology may occur either in the form of an additional tooth (paramolar) or supernumerary cusp (paramolar tubercle). The knowledge of the internal anatomy of the paramolar tubercles is very important as they influence the treatment outcome. This case report investigates the anatomical and morphological characteristics of a case with well-developed lobulated cusp occurring on the buccal surface of maxillary left second molar with the aid of CBCT and Vistascan.

Introduction

Paramolar tubercle is additional cusp present on buccal surface of a permanent molar. Dahlberg in 1945 introduced paleontologic nomenclature where he referred to this structure as “parastyle” when additional cusp presents in the upper molars and “protostylid” when additional cusp presents in the lower molars. Morphologically they attain a shape called tuberculate i.e. barrel shaped crown with rudimentary root, often paired. Incidence of paramolar tubercle varies from 0% to 0.1% in maxillary first molars, 0.4% to 2.8% in maxillary second molars and 0% to 4.7% in maxillary third molars. Variations in tooth morphology and anatomy makes endodontic treatment challenging. Hence, a proper understanding of these variations is important in order to ensure success in endodontic treatment. Conventional intraoral radiographs have their own inherent limitation that may restrict their use in the management of certain complicated cases. To avoid these limitations Vista scan and Cone beam computed tomography (CBCT) had been used in this study as an adjunctive tool in the interpretation of this root canal anatomy. This article presents a case report on the endodontic management of maxillary second molar fused to paramolar tubercle that was successfully managed with the aid of cone beam computed tomography and Vistascan.

Case report

A 25-year-old female patient reported to the department of conservative dentistry and endodontics with a chief complaint of pain in the upper left back region of the oral cavity for the past 1 week. Patient underwent incomplete endodontic access opening one year back and discontinued the treatment. On clinical examination, the left maxillary second molar was tender on percussion and it showed unusual crown morphology with a paramolar tubercle fused between the mesiobuccal and distobuccal cusp. Based on clinical and radiographic evaluation tooth showed slight periapical radiolucency and diagnosis of periapical abscess with periodontal widening was made. Patient was given medication for 5 days.

Patient was recalled after 5 days and local anesthetic agent was administered for the patient. Under rubber dam isolation, conventional endodontic access cavity was made using Endo access bur in tooth 27 and its fused counterpart. After access preparation, four canals were located with 10 size k file; namely, the mesiobuccal (MB), distobuccal (DB), and palatal canal (P) and a separate canal in the fused paramolar tubercle Fig:1. To know whether the communication existed between the canals, a CBCT (Kodak CS 9300 Care stream) 84kv,10mA,FOV 5×5cm analysis was performed with the patient’s consent Fig:2. The working length was determined and radiograph was taken with Vistascan Fig:3. Cleaning and shaping was performed using protaper NiTi instruments in a crown down manner. Irrigation was done with normal saline, 5ml of 2.5% of Sodium hypochlorite and 17% EDTA and 2% chlorhexidine. Canals were medicated with calcium hydroxide (RC cal) using
lentulo spiral and the access cavity was sealed with Cavit. The patient remained asymptomatic. Patient was recalled after 10 days. Through debridement of canals using chlorhexidine and saline was done. Canals were dried with paper points and obturation was performed using F2 gutta percha points and zinc oxide eugenol sealer and radiograph was taken with Vistascan (DURR). Access cavity was restored with light cure composite (Filtek P60) Fig:4.

**Discussion**

Paramolar tubercles have been recognized as structural characteristics confined to certain ethnic, geographical affiliations and racial background which may play an important role in its occurrence. Incidence of paramolars are reported to be infrequent among Africans, Europeans, and their descendants in America where as they are common in group of Native Americans from the southwest (Pima) and in Indians. Since they are of low occurrence they should not be classified as anomalous structure since they are normal morphological features of the dentition. Due to its low prevalence there is limited information available about the anatomical and morphological characteristics of these tubercles or its relation with the pulp chamber and root canals of the tooth with which it is associated.

Bolk reported that paramolar tubercles in maxillary molars are more likely to unite at the root but in mandibular molars they tend to possess their own roots. He also stated that a paramolar tubercle was always united with the anterior buccal cusp of the molar and its roots were attached to mesiobuccal roots. In addition, he even reported that the paramolar root was often present without the tubercle in lower molars.

Ohishi et al examined the root anatomy of 3 cases with paramolar tubercules in maxillary second molar with CBCT and stated that in all the three cases the root of the paramolar tubercle was united with the distobuccal root. All had their own pulp chamber and canals were combined with the distobuccal canal at various levels. Gurudutt Nayak et al reported the anatomical and morphological characteristics of paramolar tubercle using spiral computed tomography. The root of the paramolar tubercle was fused to the MB and DB, but the canal remained independent from the main root canals.

Preetham Jain et al reported two case reports using CBCT to know whether the communication existed between the canals and stated fusion between the canal of paramolar tubercle, mesiobuccal canal and distobuccal canal at the middle third level with a single portal of exit in one case report. In another case report CBCT revealed fusion between the paramolar tubercle canal and the mesiobuccal canal (MB1) at the coronal one third. The distobuccal canal (DB), second mesiobuccal canal (MB2) and the palatal canals (P) remained separate at this level.

In our case report CBCT and Vistascan had shown separate portals of exit and no fusion was seen at any level and canal remain independent from main root canal. The case report coincides with Ohishi et al and Gurudutt Nayak et al in number of root canal configuration.

**Conclusion**

Use of Vistascan and CBCT provided precise information about the root canal anatomy and root canal configuration which aided in successful endodontic management of the maxillary second molars with the paramolar tubercle.

**References**

Illustrations

Illustration 1

Figures