



CBCT: A SOLUTION TO ENDODONTIC ENIGMA CAUSED BY IMPACTED INCOMPLETELY FORMED SUPERNUMERARY TOOTH

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ABSTRACT

Accurate diagnosis can minimize the potential complications caused by un-erupted supernumerary teeth. Cone beam computed tomography has recently been used to evaluate un-erupted supernumerary teeth. This technique yields detailed 3D images of local structures and may prove useful in pre-treatment evaluation of supernumerary teeth and its association with adjacent structures to avoid iatrogenic damage to adjacent structures due to misdiagnosis. This paper present a case of un-erupted incompletely formed supernumerary tooth present between second premolar and palatal root of maxillary first molar which was diagnosed precisely by using CBCT to avoid iatrogenic complications.

INTRODUCTION

A supernumerary tooth can be defined as one that is additional to the normal series and can be found in almost any region of the dental arch¹. These teeth may occur singly, multiples, unilaterally or bilaterally, erupted or impacted, both in the deciduous as well as in permanent dentition. The aetiology of supernumerary teeth is not completely understood. Environmental and genetic factors both have been considered².

The prevalence of supernumerary teeth has been reported differently in different studies ranging from 0.1% to 3.8%³⁻⁵. About 90% of all supernumerary teeth occur in the premaxilla⁶. The prevalence of supernumerary premolars is a rare anomaly accounting to only 8.0 to 10% cases of all the supernumeraries⁷. Solares et al have reported that these supernumerary teeth may lie dormant at the apices of the permanent premolars and molars⁸. The formation of supernumerary premolars is often delayed, and these teeth commonly develop on the lingual side of the normal premolars⁸.

Most problems associated with supernumerary premolars are related to their potential to interfere with normal occlusal development or with orthodontic mechanics. Pathological changes associated with these supernumerary teeth are possible i.e. root resorption of adjacent tooth but not common. Presence of impacted supernumerary sometimes may lead to

endodontic misdiagnosis, which may ultimately results in iatrogenic complications.

In order to localize an impacted supernumerary tooth, the parallax method is recommended. In addition, cone beam computed tomography has recently been used to evaluate supernumerary teeth⁹. This technique yield detailed three dimensional images of local structures and may prove useful in pre treatment evaluation of supernumerary teeth and surrounding structures. Studies have found CBCT to be more effective device in the assessment of impacted supernumerary tooth, in comparison to the conventional intraoral radiographs¹⁰. This case report present a case of incompletely formed impacted supernumerary tooth, present between root of maxillary second premolar and palatal root of first molar, which was confirmed by CBCT imaging.

Case report

A 18 year old male patient reported with the chief complains of pain in his upper right back tooth since last 3 days. Clinical examination revealed a deep occlusal carious lesion in relation to right maxillary first molar. The tooth was tender on vertical percussion. Thermal and electric pulp testing elicited a negative response. Preoperative radiograph revealed radiolucency approaching the pulp space and widening of periodontal ligament space in relation to root apices of right maxillary first molar (fig.1a). A diagnosis of necrotic pulp

with symptomatic apical periodontitis was established and endodontic therapy was planned. Preoperative radiograph was present with a radiopaque object near the roots of first molar, resembling extra root extending from the tooth.



Fig 1 Preoperative radiograph revealing radiopaque mass near the mesiobuccal root of maxillary first molar.

After administration of anesthesia, endodontic access was prepared under rubber dam isolation. After scouting the root canals, flaring of the coronal thirds was performed with a ProTaper SX rotary file (Dentsply, maillefer). Working length was determined using an electronic apex locator (propex II, Dentsply) and confirmed radiographically (fig. 1b). Working length radiograph revealed that no file was approaching the radiopaque mass. Modifications in the access were done to search for any extra root or root canal.

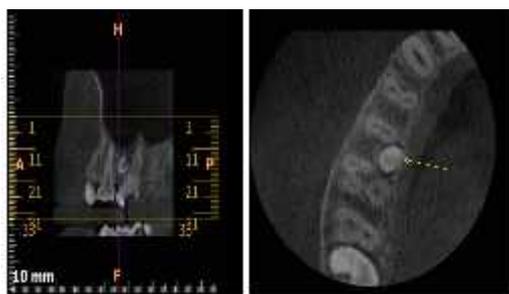


Fig 2 CBCT Axial view revealing presence of unerupted incompletely formed supernumerary tooth present between 15 and palatal root of 16.



Fig 3 Postoperative radiograph.

Multiple IOPA radiographs could not make clear diagnosis about the radiopaque mass. CBCT was planned and results of CBCT revealed the presence of incompletely formed supernumerary tooth mesial to the palatal root of 16. It was present between palatal root of 16 and root of 15 having root formation up to Cemento-Enamel junction (just started) which

was close to sinus floor lining, crown portion approaches palatal cortex. After confirmed diagnosis of radio-opaque mass no more efforts were made to search for any extra root or root canal, which could lead to iatrogenic complications. Four canals (mesio-buccal 1 and 2, disto-buccal and palatal) were identified and were prepared in a crown down method using ProTaper NiTi rotary instrumentation. Obturation was done with corresponding gutta purcha (Denstply, maillefer) and patient was asymptomatic during the follow up period after six months. (fig.1c,1d,1e).

DISCUSSION

Hyperdontia or supernumerary teeth describe an excess in tooth number which can occur in both the primary and the permanent dentitions¹. The etiology is unknown, but hyperactivity of the dental lamina is the most widely accepted theory¹¹. In some cases, there appears to be a hereditary tendency for the development of supernumerary teeth.

Evidence of the development of post-permanent supernumerary teeth has been provided by several authors who reported partially developed extra premolars after normal premolars have completed their root formation. Supernumerary premolar root development is considerably delayed when compared with the corresponding teeth of the normal series. Additionally, this delay in development can vary from 7 to 10 years to the normal premolars¹². In present case patient age was 18 years and root formation was just below the cement enamel junction.

Primosch¹³ classified supernumeraries into two types according to their shape: supplemental and rudimentary. Supplemental or eumorphic refers to supernumerary teeth of normal shape and size. Rudimentary or dysmorphic defines teeth of abnormal shape and smaller size, including tuberculate, conical and molariform types. Conical is the most common type of supernumerary tooth found in the permanent dentition. It is usually smaller in size compared to other teeth in the dentition and is conical or peg-shaped. It may occasionally be found high and inverted into the palate or in a horizontal position. In most cases, conversely, the long axis of the tooth is normally inclined. In present case the supernumerary tooth was conical in shape.

Approximately, 90 to 98% of all supernumerary teeth found in the maxilla, with a strong predilection for the anterior region⁶. The prevalence of supernumerary teeth in the permanent dentition in different population ranges between 0.1- 3.8%³⁻⁵. Several factors might explain the apparent discrepancy in the prevalence figures reported, such as differences in age, ethnicities, radiographic technique employed and possibility of extraction of supernumerary teeth before examination. It has been reported that approximately 75% of premolar supernumerary teeth remain un-erupted while 25% are partially or fully erupted¹⁴. In present case the supernumerary tooth was incompletely formed and un-erupted.

Supernumerary teeth can cause a variety of complications in the developing dentition. Occasionally, supernumerary teeth are not associated with any adverse effects and may be detected as a chance finding during radiographic examination. Sometimes presence of an un-erupted supernumerary tooth may be misdiagnosed as anomaly in the adjacent tooth as it may be present in close proximity to the adjacent tooth root. In present case, patient was asymptomatic and there was no effect

on occlusion. The supernumerary tooth was found by chance on the radiograph taken for the treatment of adjacent tooth.

Conventional radiographic methods such as parallax and panoramic radiography produces valuable diagnostic results but not with the absolute diagnostic information performance and accuracy as that of the CBCT X-ray units.

In the urge to achieve the best diagnostic efficacy, and consequently the finest therapeutic results, 3D-CBCT was applied to show critical areas of interest or to clarify uncertain diagnostic questions and indistinct clinical findings, in which conventional 2D radiological diagnosis did not seem to be sufficient¹⁵. Cone beam computed tomography provides the greatest diagnostic yield of an impacted supernumerary tooth and its position relative to the roots of adjacent teeth. However this increased diagnostic yield needs to be balanced against the higher radiation dose to the patient from this type of imaging as well as the increased cost. The argument against using CBCT is that a typical CT slice data needs a radiation dose similar to a whole mouth series of radiographs. CBCT may in future when it produces good results with a lower dose of radiation, replaces multiple x-ray examinations such as dental panoramic examination and lateral skull films, making its therapeutic benefits of greater significance.

CONCLUSION

The CBCT provides true and precise anatomical information with high predictability without distortion or artifacts, and seems more predictable compare to conventional radiography. CBCT provides precise anatomical information which may prevent iatrogenic complications due to misdiagnosis because of presence of un-erupted supernumerary tooth thus results in better treatment success.

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