

Role of CBCT in the Diagnosis of A Rare Dental Anomaly Associated with Supernumerary Teeth: A Case Series

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ABSTRACT

Introduction: Supernumerary teeth are common developmental aberrations that pose problems delaying teeth eruption. Like supernumerary teeth, Dens Invaginatus is also a developmental anomaly. However, its occurrence in a supernumerary teeth is rare. A two-dimensional radiograph may not be sufficient to guide us in achieving the correct diagnosis and subsequent treatment planning. A Cone beam computed tomography in such cases can be used as valuable diagnostic tool as they present a three dimensional picture of the anomalous tooth.

Case report: This article presents three case reports where patients presented with missing permanent teeth in maxillary anterior region. Two dimensional planar radiograph revealed hindrance of their eruption by supernumeraries. CBCT, done to determine their three dimensional spatial position revealed Dens invaginatus in the supernumeraries in all the three cases.

Conclusion: Dens invaginatus within a supernumerary is a rare entity. A CBCT in such cases can aid in presenting three dimensional pictures of the dental aberrations and their surrounding region in all the three planes, to help in determining the effective treatment plan for such cases.

Keywords: Supernumerary Tooth, Dens Invaginatus, Cone Beam Computed Tomography

INTRODUCTION

Supernumerary teeth is defined as an excess number of teeth in either the deciduous or permanent dentition.^{1,2,3}

Dens invaginatus is a developmental anomaly which appears as a deep fissure on the lingual surfaces of anterior teeth. The radiographic examination is the *sine quo non* for diagnosis of dens invaginatus.^{5,6}

Conventional radiography provides 2D representation of a 3D structure. The introduction of cone-beam computed tomography (CBCT) specifically dedicated to imaging the maxillofacial region has provided opportunity to observe an area in three different planes. Given its ability to visualize tooth morphology in three dimensions, use of CBCT is suggested in the identification of all dental anomalies.^{7,8}

Although both supernumeraries and dens invaginatus are frequent occurrences, dens in a supernumerary is rare. In this report, three such cases have been presented, where the diagnosis of dens invaginatus in the supernumerary teeth were accidental findings seen while CBCT was undertaken to investigate the reason for unerupted permanent teeth.

CASE DESCRIPTION

Case Report I:

An 11-year-old patient reported with a complaint of missing

maxillary central incisors. Panoramic radiograph revealed impacted teeth 11 and 21 (Figure 1A). Two radio-opaque tooth like structures were seen in the anatomical position of the central incisors and diagnosed as supernumerary teeth. To observe the bucco-lingual and occluso-palatal positions of supernumeraries CBCT was performed using Sirona Orthophos XG. The machine was operated at a peak voltage of 85kVp and tube current of 5mA with scan time of 14.2s. The FOV was 8cmsX 8cms with a slice thickness of 0.16 mm. This generated radiation dose of 64μSv.

Cross-section of supernumerary associated with tooth 11 shows a circular or oval shaped deformed structure with a poorly defined central radiolucent area surrounded by a radio-opaque border (Figure 1B). The axial section of supernumerary in 21 region shows an inverted teardrop-shaped radiolucency surrounded by thick radioopaque border of calcified tissue in. The invagination was seen to extend upto half length of the tooth into the root. Both the cases were diagnosed as dens invaginatus within a supernumerary tooth.

Case Report II

A 13 year old patient reported with a similar complaint of missing tooth 21. Eruption of 21 was seen to be hindered by an impacted supernumerary. CBCT revealed a classical tear drop radiolucency of a dens invaginatus within the impacted supernumerary (Figure 2A). Cross section of the supernumerary shows the invagination of the dens pushing the main pulp canal peripherally giving a radioluscent ribbon like appearance (Figure 2B).

Case Report III

A case of unerupted tooth 21 was presented by a 12 year old male. Axial section of CBCT of that area showed an impacted supernumerary tooth in place of 21 (Figure 3A).

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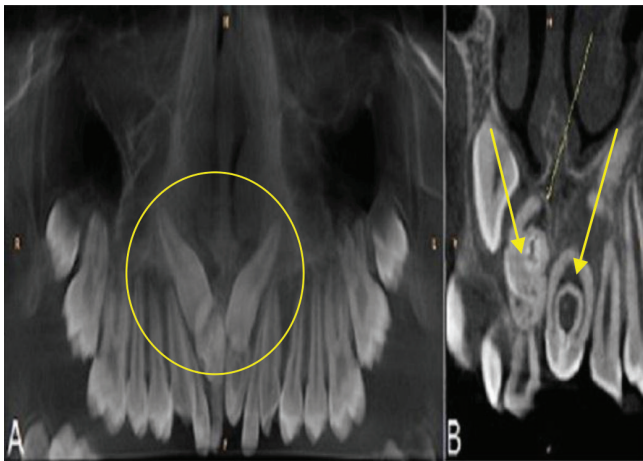


Figure-1: (A) Panoramic radiograph revealed impacted teeth 11 and 21; (B) Cross-section of the supernumerary teeth associated with teeth 11 and 21 showed an oval shaped deformed structure with a poorly defined central radiolucent area surrounded by a radio-opaque border S/o Dens invaginatus

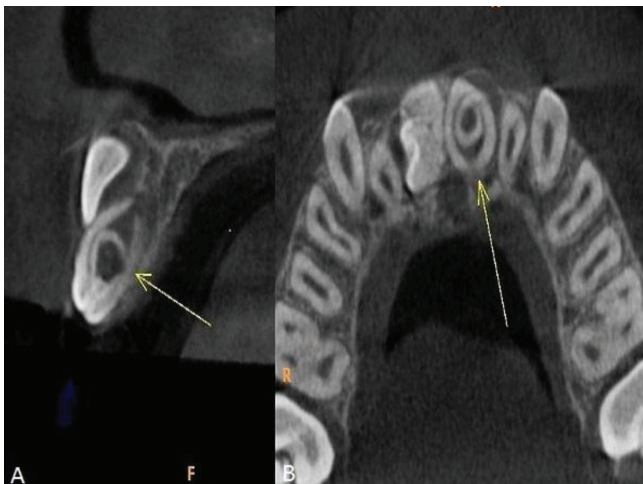


Figure-2: (A) Tear drop shaped radiolucency of a dens invaginatus within the impacted supernumerary wrt tooth 21; (B) Cross section of the supernumerary showed the invagination of the dens pushing the main pulp canal peripherally giving a radiolucent ribbon like appearance

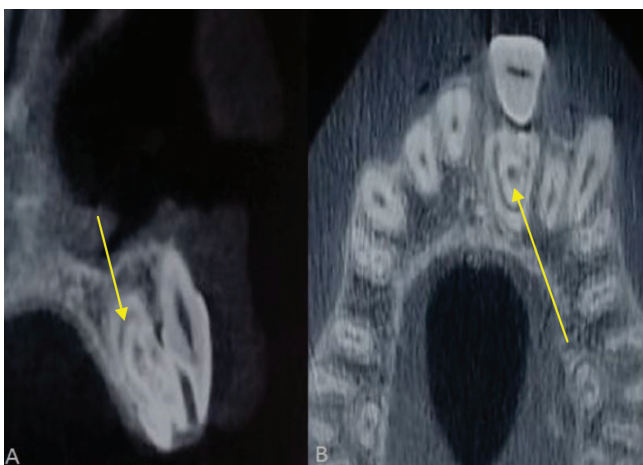


Figure-3: (A) Impacted supernumerary tooth in place of tooth 21; (B) Cross-section revealed a radiolucent invagination surrounded by a radioopaque border was seen within the supernumerary tooth S/o Dens invaginatus

Cross-sectionally, a radiolucent invagination surrounded by radiopaque border was seen within the supernumerary tooth pushing the main pulp canal to one side, presenting a radiographic picture similar to case II (Figure 3B). Diagnosis of dens invaginatus within the supernumerary tooth was made.

DISCUSSION

A supernumerary tooth is a developmental aberration where an additional entity is present along with the normal set of dentition, that may or may not resemble a typical tooth¹. The etiology remains unknown.² Cases with one or two supernumerary teeth are most common in maxillary anterior region followed by mandibular premolars.² However, multiple supernumeraries are often associated with some syndrome. The presence of a supernumerary may be an accidental finding following radiographic investigation or during clinical examination. Effects of supernumerary teeth on the developing dentition may be seen as crowding of permanent teeth or failure of eruption of the adjacent permanent teeth (30-60%).³

Dens invaginatus is a dental anomaly where the enamel organ invaginates into the dental papilla prior to hard tissue mineralisation. This begins at the crown and often extends into the root.¹ Multiple etiologic factors like increased localised external pressure, retardation or acceleration of growth of the internal enamel epithelium, infection during tooth development, genetic components may cause its occurrence.^{1,4}

It is a relatively rare malformation with a prevalence of 0.3-10%.⁴ The permanent maxillary central incisors are most commonly involved followed by the maxillary laterals^{1,4}. However rare incidences have been reported in maxillary premolars and canines, mandibular teeth and deciduous dentition.⁵ Incidence within a supernumerary is considerably low with reported rate of 0.25-10%.⁴

Dens invaginatus is often asymptomatic. The crown form of the erupted tooth with dens invaginatus may show no abnormality except a deep lingual/palatal pit.^{4,5} The internal anatomy of the affected tooth displays a tear drop shaped invagination that may extend upto the root. Oehler presented a classification of Dens invaginatus for diagnostic and treatment needs.⁹ The enamel lining of the invagination is often hypomineralised and remains in close proximity with the pulp chamber. Direct communications may also be present between the invagination and the pulp cavity. Entry of irritants into the dilatation predispose the enamel barrier to carious decay.⁴

In most cases, Dens invaginatus is a surreptitious finding on radiograph, unless it is associated with any pulpal or periapical pathology. Radiographically, the aberration appears as a tear-drop shaped radiolucency, extending within the tooth with the enamel surrounding the invagination as a radio opaque border.⁶

Conventional planar radiograph shows a 2D picture. CBCT can provide a 3D view of the complex anatomical variations seen in dens invaginatus.^{6,7} This helps the clinician to diagnose

any pathology associated with the tooth and subsequently determine the feasibility of endodontic treatment, if required⁵. CBCT is especially useful for determining the buccolingual/mesiodistal positioning of the supernumeraries with the dens invaginatus that hinder the pathway of eruption of the permanent teeth and their subsequent management.

Although, the radiation dose with CBCT is more than planar radiographs, it is less than conventional CT. The choice of CBCT as a diagnostic tool for dens invaginatus should always be regarded in view of applicability and risk:benefit ratio.

In cases of dens invaginatus occurring in permanent dentition, attempt should be made to retain the tooth and plan conservative treatment approaches. However, if the anomaly is seen to occur in a supernumerary that is causing delayed eruption of permanent teeth, it is recommended that extraction of the concerned tooth be undertaken.⁵

CONCLUSION

Dens invaginatus occurring in a supernumerary tooth is a rare finding. The exact location of the supernumerary tooth and the morphology of dens should be determined to decide whether the supernumerary tooth is salvageable or needs extraction. CBCT in such cases can be a useful diagnostic tool that presents a 3D picture of the complex internal morphology of the anomaly, facilitating treatment modality.

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