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Surgical management of Palatally placed, Inverted and Impacted Mesiodens using CBCT – A Developmental Mishap

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Abstract

Supernumerary tooth is a developmental anomaly and has been argued to arise from multiple etiologies. A mesiodens is a supernumerary tooth located in the maxillary central incisor region. Mesiodens can occur individually or as multiples and often do not erupt. They are generally peg shaped and are usually located palatally between the maxillary central incisors, tending to displace the erupting permanent central incisors. The present case depicts the surgical management of palatally placed, inverted and impacted mesiodens using CBCT for accurate localization and initiating correct diagnosis and treatment planning.

Keywords: CBCT, Developmental anomaly, Mesiodens, Supernumerary teeth, surgical management.

Introduction

Developmental dental anomalies generally manifest as a variation in tooth size, shape, number, or structure. A supernumerary tooth is a developmental anomaly of number characterized by the presence of tooth in addition to the normal series [1]. Its prevalence rates reported in the literature vary between 0.1% and 3.6% in the permanent dentition depending on the respective population [2]. However, in deciduous teeth, prevalence is lower amounting to 0.3–0.8% [3]. There is a slight male preponderance with the ratio of male: female, 2:1. While

supernumerary tooth may be found in any region of the dental arch, the most common site is the palatal midline between the two maxillary central incisors, where it is termed as mesiodens [4]. Mesiodens account for 80% of all supernumerary teeth [5]. Based on its morphology, mesiodens can be classified as conical, supplemental and tuberculate type [6, 7]

The theories that have been suggested for their occurrence include "phylogenetic theory" (Smith, 1969) [8], the "dichotomy theory" (Liu, 1995) [9], a hyperactive dental lamina (Primosh, 1981; Brook, 1984) [10, 11] and a combination of genetic and environmental factors – unified etiologic explanation (Brook, 1984) [11].

Most of the patients with mesiodens are diagnosed amid routine clinical and radiographic evaluation. The Precise location of impacted mesiodens and its effect on the adjacent structures are very important for diagnosis and treatment planning. Mesiodens may be impacted or erupted. It may remain in position for many years, without clinical manifestations. Sometimes complications can be seen associated with them such as impaction, delayed eruption, ectopic eruption, crowding, diastema, and eruption into the nasal floor, formation of primordial or follicular cyst with bone destruction, pain and swelling at the site and resorption of the adjacent root. Thus, early detection and removal of mesiodens is very important to prevent such complications.

Conventional radiographic methods such as periapical views, occlusal views, and panoramic radiographs play a significant role in the diagnosis of a mesiodens and complications resulting from it. However, all these mentioned views enable to locate the teeth in only two dimensions, also because of the superimposition of anatomical structures, supernumerary teeth may be overlooked on conventional radiographs thus exact diagnosis and treatment plan cannot be carried out relying on these conventional radiographic methods.

Thus Cone beam computed tomography (CBCT) provides three-dimensional (3D) image of an impacted mesiodens in axial, coronal, and sagittal plane along with the 3D reconstructed imaging, thus enabling the dental practitioner to locate the teeth and observe the related changes thereby plan for the best treatment option [12].

The various advantages of cbct are:

1. Multiplanar imaging of dental tissues.
2. good image quality,
3. volumetric analysis,
4. short scan times, and
5. relatively less radiation dose than conventional medical CT, which results in greater ubiquity as an imaging modality within all disciplines of dentistry.
6. Ease of data transfer
7. can provide precise and accurate information on normal and pathologic conditions such as odontomas, supernumerary teeth, developmental anomalies and traumatic injuries

In recent years CBCT has been extensively used to detect impacted and supernumerary teeth. Thus this present article features rare case of palatally placed, inverted, and impacted mesiodens with delaying eruption of permanent central incisors and discussing the benefits of CBCT which are found in the assessment of morphological discrepancies and eruptive disorders and helping in correct diagnosis and treatment planning.

Case Presentation

Examination and diagnosis

A 8 year old male patient visited to the Department of Pediatric and Preventive Dentistry, National Dental College and Hospital, Derabassi with a chief complaint of delayed eruption of the permanent maxillary central incisors. The family history of the child patient was non-

contributory. Medical history revealed no systemic diseases, and the dental history proved no facial trauma or other tooth abnormalities have occurred.

Thorough intraoral examination revealed the presence of mixed dentition in both maxillary and mandibular arches. Patients avowed that he was operated on, 1 month ago for the decayed right maxillary deciduous incisor for the eruption of the permanent incisor. A previous routine intraoral periapical radiograph showed the presence of supernumerary teeth in close proximity to the permanent central incisors.

Thorough intraoral examination revealed the presence of mixed dentition and absence of the left maxillary permanent central and lateral incisors **(Figure1)**

Figure 1

The patient was referred to CBCT examination of the maxilla to assist the localization and orientation of the Mesiodens. CBCT images were requested for diagnosing accurately the morphology and exact location of the Mesiodens and the radicular formation of the permanent maxillary central inscisors. So the images were created and viewed using a dental CT software program.

A 3D CBCT panorex showed the presence of supernumerary teeth in close proximity to the left central incisor **(Figure 2).** Axial slice image of CBCT revealed the palatal position of the impacted, inverted Mesiodens. Sagittal slicing reveals the supernumerary tooth in palatal position over the impacted central inscisor **(Figure 3).**

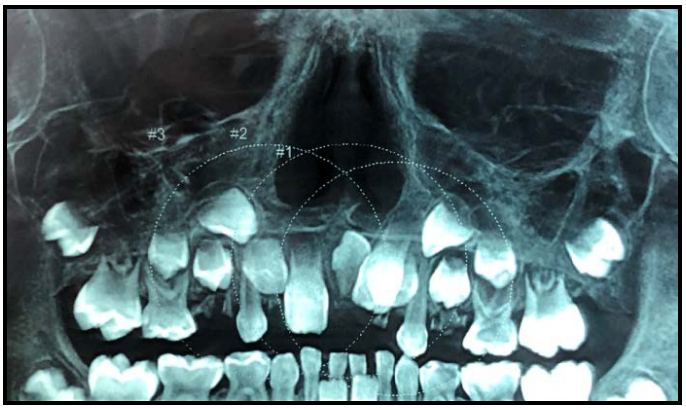

Figure 2: Presence of Mesiodens in CBCT

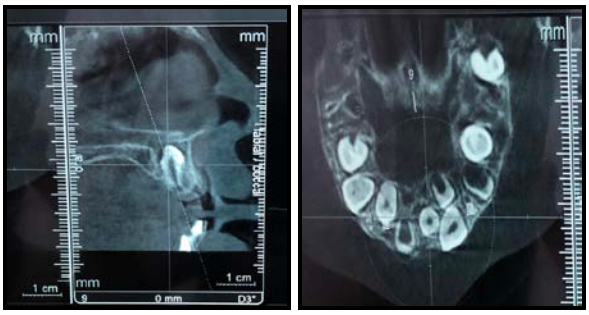

Figure 3: Presence of inverted palatally placed Mesiodens

Treatment plan

A comprehensive treatment plan was formulated which included surgical extraction of the Mesiodens. The patient was administered local anesthesia under conscious sedation **(Figure 4)**, which involved the extraction of left primary incisors.). Using a mucoperiosteal elevator, a full thickness palatal flap was raised **(Figure 5).** The Mesiodens was exposed, luxated and removed **(Figure 6).** Hemostasis was achieved and the flap was replaced back and sutured **(Figure 7).** Post sedation trigger test was done **(Figure 8)**. Postsurgical instructions were explained to the patient along the prescription of antibiotics and analgesic treatment. The recall visits were scheduled for the following week to remove suture and evaluate the healing process **(Figure 9)**. The patient was kept under the observation until the successful eruption of the permanent central incisor.

Figure 4: Treatment done under conscious sedation

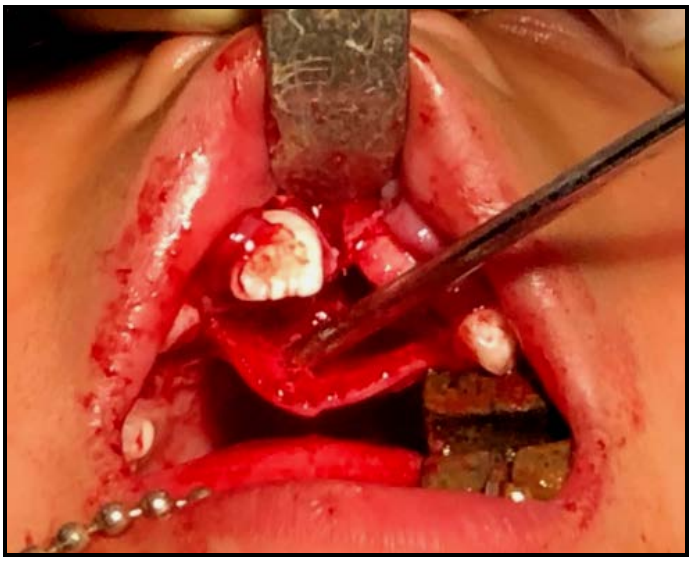

Figure 5: Full thickness mucoperiosteal flap raised

Figure 6: Surgical removal of Mesiodens

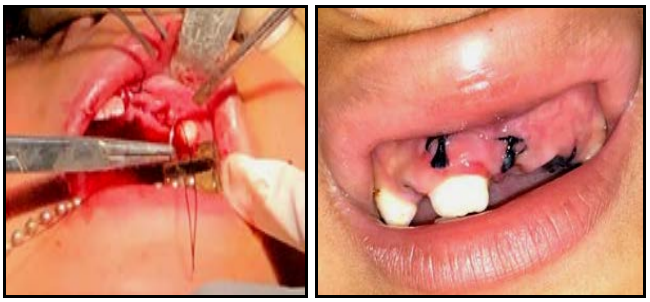

Figure 7: Palatal Flap replaced back and sutured

Figure 8: Post sedation Trigger test

Figure 9 Follow up – 1 week

Discussion

Balk (1917) defined mesiodens as the most common among supernumerary teeth, located mesial to both central incisors; appearing peg shaped, in a normal or inverted position [13].

This type of anomaly can be discovered as a result of patient's complaint or when they seek treatment for malocclusion or by bony swelling, most commonly in the anterior palatal region. The impacted mesiodens are often diagnosed by radiographic examination [14].

Delayed, ectopic or asymmetric eruption of the central incisors should alert the clinician to the possibility of a mesiodens. A radiological examination is critical for correct diagnosis and treatment planning. For a precise view in the incisor region, an anterior occlusal is also helpful, but nowadays CBCT shows the correct position and localization of mesiodens. CBCT provides precise location of the impacted supernumerary teeth and allows accurate linear measurement of the distances from the anatomical structures and cortical plates. These advantages of CBCT enable correct and less invasive surgical planning with a less risk of damage [15, 16], Panoramic and periapical radiographies both magnify and distort the images often resulting in inadequate diagnostic certainty [16].

There is controversy in the literature regarding the time of removal of any unerupted mesiodens. The immediate removal versus delay in surgical intervention following root development of the central incisor and the lateral incisor about the age of eight to 10 years has been mentioned [17].

In order to promote eruption and proper alignment of adjacent teeth, it is recommended to extract mesiodens in the early mixed dentition, which may reduce the need for orthodontic treatment. It might take six months to three years for an unerupted tooth to erupt after removal of the mesiodens [18].

Mesiodens can cause a variety of complications, mainly when unerupted teeth affect the maxillary incisors, root resorption, axial rotation or displacement, diastema and dentigerous cyst formation [19]. Once a mesiodens has been diagnosed, treatment should be planned.

Yagüe-García [20] emphasized that the early removal of the supernumerary teeth in order to prevent complications is the treatment of choice. Solares [21] recommended extraction of mesiodens in the early mixed dentition in order to facilitate spontaneous eruption and alignment of the incisors. Henry [22] suggested delayed extraction of the mesiodens, at about the age of 10, when the apex of the central incisor nearly formed. If treatment is postponed after this age, more complex surgical and orthodontic treatment may be necessary. The type and position of the un-erupted tooth, the space available in the dental arch, in addition to the stage of root development may influence how long it takes for an impacted tooth to erupt after surgical removal of the mesiodens [23].

Therefore, after a clinical and radiographic examination, if extraction of a supernumerary is necessary, it should be performed at an appropriate time to promote self-eruption

in early mixed dentition; this will result in better teeth alignment and can minimize the need for orthodontic treatment or any alteration in adjacent teeth.

Conclusion

Supernumerary teeth are of huge concern to both dentist and patient because of its potential problems and complications. On diagnosis, every case should be treated properly to lessen problems to the developing tooth buds and dentition. Extraction of mesiodens in the early mixed dentition helps spontaneous alignment of the adjacent teeth; however, symptomless cases could be left untreated along with long term follow up.

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