

Mesiodens and Interrelationship with Duplication of Congenital Complete Duplex of Left Kidney with Much Smaller Upper Pole in a Young Female

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Abstract

Supernumerary teeth (SN) teeth are a relatively rare phenomenon that can occur anywhere in the dental arch. This report represents a case of a young female patient that is presented with one SN tooth specifically mesiodens, which prevented her upper central incisor from erupting in its normal sequence. This patient also reported to have a congenital complete duplex of left kidney that has much smaller upper pole and a normal size lower one, with a sperate ureter of each, and growth hormone deficiency. This is a non-syndromic patient. In the literature review there has been some linking between growth hormone deficiency and SN teeth. However, up to this research in the literature, no case was found linking between complete duplex of kidney and ureter, and SN tooth. This report also viewing radiographic CBCT regarding mesiodens, in three views (coronal, sagittal, and axial).

Keywords: Mesiodens Interrelationship Kidney Young Female.

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INTRODUCTION

Supernumerary teeth are a relatively rare phenomenon that can occur anywhere in the dental arch [1]. Of all supernumerary teeth, Mesiodens is the most common [1, 2]. It is also defined as the existence of an extra tooth- or teeth more than the number that is present in the primary or permanent dentition [3]. Furthermore, it represents a common human dental anomaly [3]. Mesiodens is considered as a common clinical finding among children and includes a higher predominance in Asian populaces[4].The prevalence of supernumerary tooth from previous studies varies between 0.04% to 2.29% [5]. A study done by Shekhar M. G. in 2012, in Saudi Arabia, stated that the overall prevalence of premaxillary supernumerary teeth in primary and mixed dentitions was 1.9%, and single supernumerary tooth had the highest percentage [6]. Moreover, most of supernumerary teeth are located in the anterior region in the maxilla [7]. In which mesiodens is the most common form of supernumerary teeth [8]. Mesiodens are almost always impacted [9]. It is usually located in the site of the palatal midline

between the two maxillary central incisors and its best diagnosed by clinical and radiographic examination [10]. The highest prevalence of mesiodens with a percentage of 0.8% was conical shape, palatal position, and vertical orientation [10]. The position of mesiodens and the eruption time of the adjacent permanent incisors could affect the complication rate that is associated with mesiodens tooth [11]. In an article that mentioned how mesiodens issues and complications should be managed before the eruption of lateral incisor[12]. However, the ideal time of surgical Intervention is debatable [13]. Most of the cases associated with supernumerary teeth are idiopathic, but in cases where there are multiple supernumerary teeth, it is most likely to be associated with syndromes [3]. Differentials for mesiodens incorporates a solitary median maxillary central incisor, displayed within the minor shape of holoprosencephaly or a conical shaped formed tooth present in ectodermal dysplasia as hypomelanosis [14].

CASE REPORT

A 12-year old Female patient from Africa was reported in the oral medicine clinic in 2017

at Dental University Hospital, King Saud University. Her parents were worried and complaining from unerupted upper central incisor, Upon clinical examination, she has multiple carious teeth, and unerupted upper central incisor. Upon radiographic examination, the panoramic radiograph taken in 2016 "Fig1" by her dental pediatrician showed supernumerary tooth located left to the upper anterior region preventing the eruption of tooth number #21. Medical history revealed that the patient is taking growth hormone medication. Moreover, the medical history obtained from internal medicine department reported that this patient is known to have congenital complete duplex of left kidney with much smaller upper pole, and a normal size lower one, and a sperate ureter of each. And a stable cystic structure at the upper pole of the left kidney"Fig2". However, in 2018 left Kidney showed normal echogenicity, and preserved cortical medullary differentiation. The right kidney measured 8.6*3.7 cm. While the left kidney measured 7.8*4.5 cm. No evident of stone or right hydronephrosis. Her family history didn't reveal any-similar condition. The patient was booked for pediatric and orthodontics clinic. As an investigational procedure, a Cone-Beam Computed Tomography (CBCT) was obtained by the oral surgeon for accurate localization of the supernumerary tooth. It consisted of small field of view CBCT of the anterior maxilla.



Fig-1: Panoramic radiograph



Fig-2: Ultrasound of the left kidney

DISCUSSION

Etiology

The exact cause of mesiodens is unknown. However, it could be linked with genetics [15]. And

environmental factors [16]. In addition, it could be associated with some syndromes like Gardner syndrome [17], and it may also be associated with precocious puberty (PP) which may be identified by signs of pubertal development in girls aged less than eight years old and in boys aged less than nine years old [18]. Precocious puberty (PP) is divided to peripheral precocious puberty(PPP), and central precocious puberty (CPP) these are differentiated using gonadotropin releasing hormone stimulation test [19]. Mesiodens was extremely associated with CPP, and sometimes was considered as a predictor for CPP [19]. Furthermore, deficiency of growth hormone was reported in patients with multiple dental anomalies [20].

Usually having multiple impacted or erupted supernumerary teeth is rare, and it has been found in patients with syndromes, some of the syndromes that has supernumerary teeth in their findings are: cleidocranial dysplasia, familial adenomatous polyposis, trichorhinophalangeal syndrome type I, Rubinstein-Taybi syndrome, Nance-Horan syndrome, Opitz G/BBB syndrome, oculofaciocardiodental syndrome and Robinow syndrome (autosomal dominant) [3]. Another syndrome that was less mentioned in the literature is Ellis van Creveld syndrome, which has a very rare occurrence inherited as an autosomal recessive disease, such reported cases having :supernumerary tooth, talon cusp, reduced crown size, and early eruption of teeth , these patients also manifest dwarfism [21]. In the current case, the patient has growth hormone deficiency, and a supernumerary tooth so she has some similarity with Ellis van Creveld syndrome, but she is not diagnosed any syndrome. In a study done by Sood PB, Sood M In 1992 reported polydactyly with an impacted supernumerary tooth [22]. Polydactyly is an inherited deformity and it's a result from a dominant mutation which shows as a supernumerary (extra digit) on the hand or feet, it's reported in humans and mammals [23]. It is also considered as the most common hereditary limb anomaly [24]. Polydactyly could occur isolated without syndromic polydactyly and could occur as anomaly associated with syndromic polydactyly [25]. In current case we reported (anomaly) which is a duplication of the kidney and ureter that was found with the supernumerary tooth on the same patient.

So there is also a similarity between polydactyly and this case. As polydactyly is considered as a common congenital anomaly [26]. It is also classified as a duplication limb deficit, which is the extra digit [26]. Duplication of the ureter is considered as a common anomaly with prevalence of 0.7% to 1% in the population [27]. There have been cases reported of having duplicated ureters [27, 28]. Unfortunately as far as our knowledge no cases were reported to have extra ureter and an extra tooth.

Supernumerary (SN) teeth that have been impacted are often in close proximity to cortical bone. While this may make surgical access easier, there is a chance that surrounding anatomical structures will be harmed. As a result, CBCT assessment of affected supernumerary teeth is recommended for accurate case planning [4, 29]. The CBCT report showed that supernumerary tooth is located at the left of upper anterior region. The mesiodens is located left to the midline; it is impacted horizontally with distal orientation, just under the cusp of tooth #21, causing distal inclination of #21. Root closure of #21 is not finished yet. However, the follicle of SN is continuous with the tooth follicle of #21. No external root resorption found.

Displacement of incisors was observed in association with SN tooth [30]. Early detection of the supernumerary tooth allows the most effective care and treatment, which minimize the extent of the surgery, orthodontic treatment and potential complication [31]. Early surgical extraction of mesiodens of the SN [4, 32] with follow-ups is the recommended treatment [32].

When it comes to testing the pediatric abdomen, ultrasound is often used as the first imaging modality "Fig2" [33]. Contrast-enhanced ultrasound (CEUS) appears to be an appropriate alternative to Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) for characterization of renal masses, according to the current evidence [34]. In a study done by Sarica and colleagues in 2019, found that impacted teeth can cause pathologies such as cyst or tumors, the percentage was 8.6% among 608 patients [35] which is considered a high value.

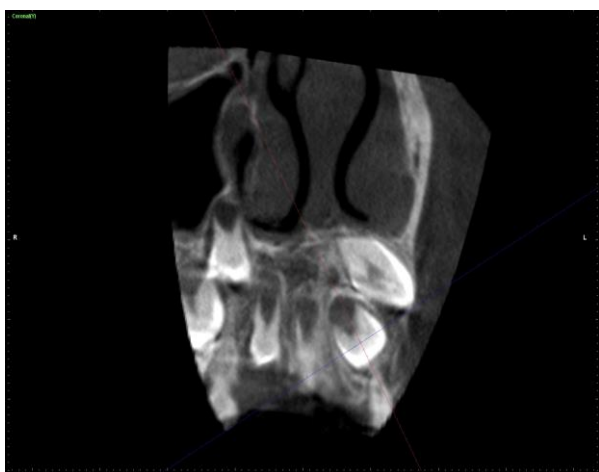


Fig-3: CBCT of the coronal view “showing the impacted mesiodens below the level of nasal septum”[1].

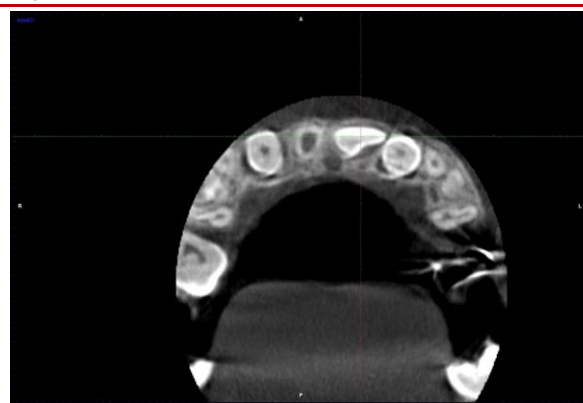


Fig-4: CBCT of the axial view” showing only the crown portion of the impacted mesiodens”[1].

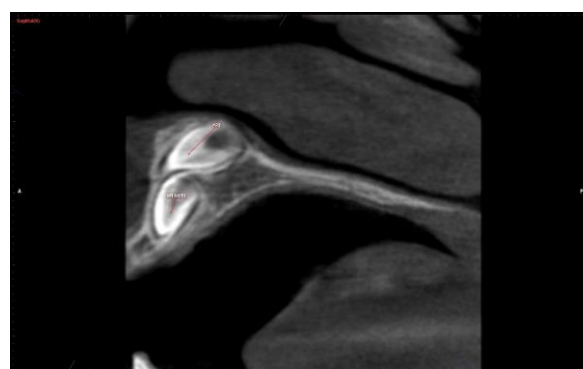


Fig-5: CBCT of the sagittal view “showing the impacted mesiodens below the level of the tooth #21”[1].

Treatment

Patient then was referred to be checked by dental pediatrician, orthodontist, and surgeon for full dental treatment plan.

- Extraction was done for the supernumerary tooth by the surgeon [36].
- All caries were removed, and then ortho treatment was started.
- The treatment of duplicated ureter and kidney differs depending on the clinical classification [37]. So regarding the duplicated kidney and ureter it was followed up with the internal medicine department. As the point from the treatment is to maintain effective renal units as possible [37].

CONCLUSION

The early the diagnosis of the supernumerary tooth, the less complication of the treatment required. According to the finding of this case, investigational procedures should be done to the patient that has SN tooth, which includes check-ups of growth hormone, duplicated organs, or any other anomalies.

Consent

The patient parents have agreed to publish her clinical findings in this article, but without sharing any personal information.

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