Management of a Severely Rotated Maxillary Incisor Associated With a Pair of Impacted Mesiodens- A Case Report

Sadique Mohammad[1], Prosanta Kumar Mondal[2], Shreyasi Chakraborty[3], Tanvi Islam[4], Dipankar Halder[5], Sk Ekramur Rahman[6], Vineet Nair [7]

[1, 4 5]Post Graduate Trainee, [2]Professor and Head, [3]Associate Professor, [6]Post Graduate Trainee, [7]Associate Professor

[1, 2, 3, 4, 5]Department of Pedodontics and Preventive Dentistry, Dr. R. Ahmed Dental College and Hospital, Kolkata, W.B, India

[6]Department of Orthodontics and Maxillofacial Orthopedics, Dr. R. Ahmed Dental College and Hospital, Kolkata, W.B, India

[7]Dept of Periodontia, Dr R Ahmed Dental College and Hospital, Kolkata

Corresponding Author: Dr. Vineet Nair

Conflict of Interest – Nil
Financial disclosure – Self funded

Abstract

Supernumerary teeth are one of the most common dental anomalies seen during the early mixed dentition period. They occur more commonly in anterior region of maxilla where they are referred to as mesiodens. These teeth can cause various complications like rotation or impaction of adjacent permanent teeth, retarded or ectopic eruption, cyst formation etc.in children. Early diagnosis and management of these teeth is essential to prevent future complications. This case report discusses the management of a rotated upper central incisor caused by the presence of a pair of mesiodens using both surgical and orthodontic intervention.

Keywords: Diagnosis; Ectopic Eruption; Mixed Dentition; Orthodontic Intervention; Supernumerary Teeth

INTRODUCTION

Supernumerary teeth are defined as those teeth or tooth-like substance in additionto the usual configuration of twenty primary and thirty-two permanent teeth.[1] This condition, also referred to as hyperdontia, can manifest as solitary condition or occur in multiple form. The presence of supernumerary teeth shows a male predilection with a ratio of 2:1.The incidence of supernumerary teeth in primary dentition ranges from 0.3-0.8% while it is around 1.5-3.5% in permanent dentition.[2]There are different methods of classifying supernumerary teeth. Morphologically, they are classified as conical, supplemental (eumorphic), tuberculate and odontome; according to topography as mesiodens, paramolar, parapremolar and distomolar; and based on orientation as vertical, inverted and transverse.[3](Table 1)

Table 1: Supernumerary teeth classification

Based on Morphology:	C) Based on Orientation
Conical	1) Vertical
Supplemental(eumorphic)	2) Inverted
Tuberculate	3) Transverse
Odontome	

Based on Topography:
Mesiodens
Paramolar
Distomolar
Parapremolar

Among all the types, mesiodens has the highest frequency of occurrence. Manuja et al [4] states that mesiodens has a prevalence rate of 0.15-1.9%. Mesiodens is situated in the maxillary midline in between the two central incisors. These teeth may be associated with some clinical presentations including midline diastema, axial rotation or inclination of the adjacent erupted permanent successors, resorption of or delayed eruption of the permanent incisors, abnormal root formation and sometimes cystic changes.[4] Clinicianscommonly use conventional radiographs to identify supernumerary tooth. However recent advancements in 3D imaging technique have made it easier for dental surgeons to precisely locate the tooth, make the optimal surgical approach which reduces damage to the adjacent anatomical structures.[5]Here, we present a case report of two impacted supernumerary teeth (mesiodens) in the maxillary anterior midline region - one vertical and the other inverted, causing rotation of the upper left central incisor.The complete management of the case was done in our department.

CASE REPORT

A 9-year-old malepatient reported to the Department of Pediatric and Preventive Dentistry with the chief complain of rotated front tooth. On clinical examination, the upper left central incisor was found to be rotated mesiolingually (Figure 1). There was no history of associated pain or trauma. Medical history of the patient as well as the parent were non-contributory. The patient's oral hygiene was good. An Intra-oral Periapical Radiograph (IOPAR)(Figure 2) and a panoramic radiograph was taken in the concerned region which revealed the presence of two impacted conical shaped mesiodens in the midline between the two central incisors. A further radiographic investigation in the form of Cone Beam Computed Tomography (CBCT) was done to determine the exact location and orientation of the two supernumerary teeth. CBCT revealed that the two teeth were located palatally in relation to the dental arch (Figure 3). A treatment plan was formulated which consisted of surgical removal of both the mesiodens followed by orthodontic de-rotation of the involved tooth and retention of the correction. The parents were informed about the treatment plan and written consent was obtained.

Prior to carrying out the surgical procedure, routine blood examinations were done and results obtained were within normal limits. The surgical procedure was undertaken in the Department of Pediatric Dentistry under local anesthesia. After providing adequateanesthesia, a full thickness palatal mucoperiosteal flap was raised thus exposing the supernumerary teeth (Figure 4). Both the teeth were removed using elevators and forceps (Figure 5). Thorough irrigation and debridement of the socket was done followed by closing of the flap with sutures.The post operative instructions were given and the patient was recalled after 7 days for suture removal.

The patient was followed up after 1 month and the clinical and radiographic examination showed complete uneventful healing of the surgical site. Orthodontic brackets were placed to de-rotate the affected central incisor. (Figure 6). After 3 months of orthodontic treatment, the central incisor was completely de-rotated. The orthodontic appliances were removed and a retainer was given. (Figure 11-13).

Figure 1: Pre-operative photograph showing rotated left upper central incisor

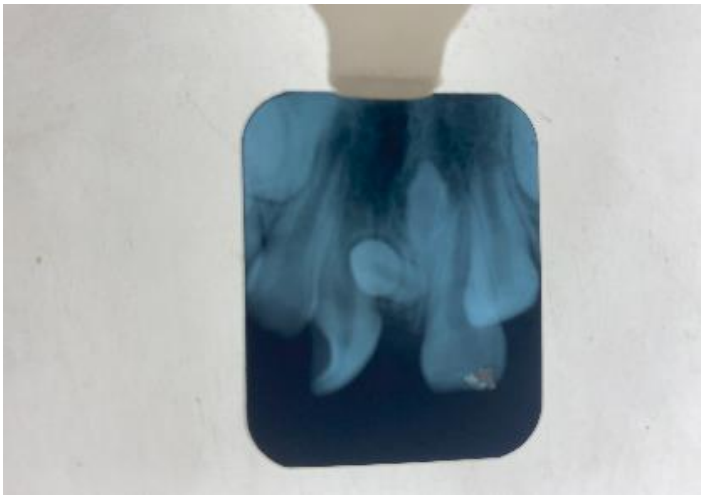

Figure2: Pre-operative IOPAR showing 2

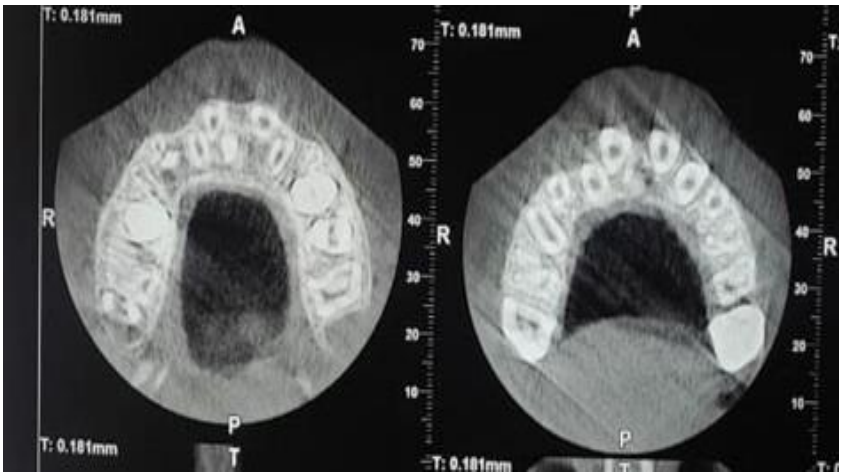

Figure 3: Pre-operative CBCT reveals impacted supernumerary teeth with rotated 21teeth located palatal to the incisors (palatal view)

Figure 4: Palatal flap raised and impactedsupernumerary tooth exposed

Figure 5: Extracted supernumerary teeth

Figure 6: Orthodontic treatment started Mesiodens (Note the conical shape of crown)

Figure 7: Complete de-rotation of 21

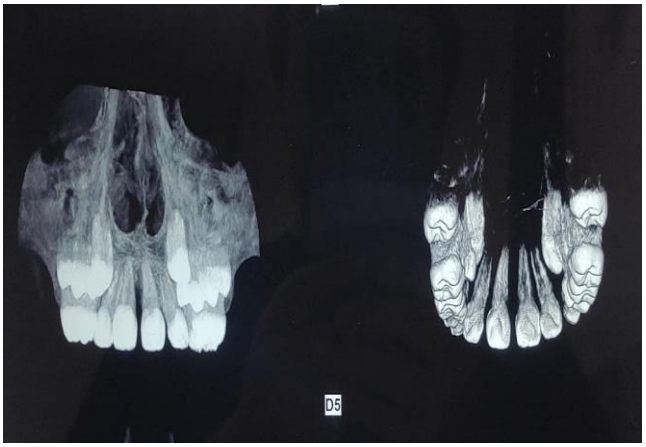

Figure 8: Radiograph showing correction of rotation achieved

Figure 9: Essix retainer placed following achieved treatment completion

DISCUSSION

Tooth rotation is the discernible intra-alveolar displacement of the tooth about its longitudinal axis, either mesiolingually or distolingually.Amongst the untreated population, the prevalence of tooth rotation ranges from 2.1 to 5.1%.

Tooth rotation can be due to a multitude of factors, including the availability of space for tooth alignment, the sequence in which teeth emerge, and the functional effects of the tongue and lips. These aspects are consistent with a multifactorial model explaining the origin of tooth malpositions.Supernumerary teeth are held responsible for being one of the most frequent causes of severe rotation of maxillary incisors.[6]

Gisele et al[7]is of the opinion that early diagnosis of supernumerary teeth can be facilitated by a careful professional clinical examination, complemented by panoramic and modified occlusal radiography of the developing paediatric patient.Supernumeraries can occur in any part of the dental arch, but they are more common on the maxilla (between 8.2 and 10 times more common), especially in the anterior portion, where they are referred to as mesiodens. The genesis of mesiodens tooth remains unknown though a few theories have been proposed.These include the atavism theory, the dichotomy of the tooth bud, the hyperactivity of the dental lamina, and genetic and environmental influences.According to the atavism theory, the genetic expression of extinct primates with three pairs of incisors is responsible for the extra teeth. According to the dichotomy concept, the tooth germ breaks into two equal-sized or different-sized components, forming two equal-sized teeth, or one normal and one dysmorphic

The last explanation is the dental lamina hyperactivity theory, which links them to the development of lingual extension of an accessory tooth germ, whereas a primitive form would arise from the epithelial proliferation of the dental lamina remnants.It can also occur as an additional complication to systemic disorders such as Gardner syndrome, , orofacial-digital syndrome, Rothmund-Thomson syndrome, cleidocranial dysplasia and cleft lip/palate.[7,8]According to Wang and Fan (2011)[9], approximately 76% to 86% of non-syndromic patients can present with a single supernumerary tooth, 12% to 23% present with two, and only 1% of this patient population can present with more than two supernumeraries, which are more common in the mandibular premolar region.[9]

According to many authors, early diagnosis of supernumerary teeth is essential for a good prognosis. Supernumerary tooth can be an incidental finding during a routine radiographic examination in the dental clinic. The optimum method of diagnosis is a comprehensive clinical and radiographic examination consisting of occlusaland maxillary anterior, periapicalradiographs to evaluate the mesiodens.A recent study found that contemporary imaging modalities like CBCT are excellent diagnostic tools for providing three-dimensional information and precise location of mesiodens.The treatment of supernumerary teeth is decided upon based on the type, location, and stage of the dental development[5,10,11]. According to Humerfelt et al, early extraction of mesiodens leads to better future outcomes.[12]Although there is some controversy regarding the surgical extraction of supernumerary teeth, most authors recommend performing the surgical procedure in the mixed dentition phase when 50% of root completion of the adjacent permanent tooth is completed.[13] In the mixed dentition, a fixed "2 × 4" appliance.(2 molar bands on first permanent molars and four bonded brackets on upper incisors) is the norm treatment for teeth rotations. Mohsin et al is of the opinion that fixed appliances in a mixed dentition can be rather complicated. They should only be used once the first molars and incisors have fully erupted[6]. S. Nagarajan et al [14]in his article compared the fixed "2 × 4" appliance with Sectional orthodontic wire appliance and concluded that the former allows a better controlled tooth movement. He also states that the Essix retainer permits better redistribution of occlusal forces when used as a post orthodontic retainer.[14]

In our case, the standard fixed "2 × 4" appliance was used to correct the rotation as sufficient number of teeth was present in the arch. The permanent maxillary canines have not yet erupted and the child is in the Ugly Duckling stage, so the slight midline diastema present post-treatment is expected to be self-corrected following the canine eruption. The same has been explained to the patient and advised for regular follow up and recall at regular intervals to monitor the status of the dentition during this vital period.

CONCLUSION

Supernumerary teeth are a huge concern to both dentist and patient as it can lead to a variety of malocclusions and other problems. Early and accurate diagnosis of the condition is important, which will help the pediatric dentist to provide preventive and interceptive treatment.The management of supernumerary teeth aredone based on their type, position, and potential complications noted during clinical and radiographic evaluation. The orthodontic therapy using fixed "2 × 4" appliance provides a good treatment option for correcting malocclusions in mixed dentition period. However, patient and parent cooperation are essential for achieving good results.

REFERENCES

1. Bahadure RN, Thosar N, Jain ES, Kharabe V, Gaikwad R. Supernumerary Teeth in Primary Dentition and Early Intervention: A Series of Case Reports. Case Reports in Dentistry. 2012; 2012:1–4.
2. Ata-Ali F, Ata-Ali J, Penarrocha-Oltra D, Penarrocha-Diago M. Prevalence, etiology, diagnosis, treatment, and complications of supernumerary teeth. Journal of Clinical and Experimental Dentistry. 2014; e414-8.
3. Parolia A, Dahal M, Thomas M, Kundabala M, Mohan M. Management of supernumerary teeth. Journal of Conservative Dentistry. 2011;14(3):221.
4. Chaudhary S, Manuja N, Nagpal R, Singh M. Management of Delayed Eruption of Permanent Maxillary Incisor associated with the Presence of Supernumerary Teeth: A Case Report. International Journal of Clinical Paediatric Dentistry. 2011;4(3):255–9.

5. Akhila R DDS. Management Of Multiple Impacted Supernumerary Teeth In A Non-Syndromic Patient Using Cone Beam CT. Dentistry. 2014;04(02).
6. Sharma R, Sidiq M, Yousuf A, Bhargava N, Ganta S. Correction of a Severely Rotated Maxillary Incisor by Elastics in Mixed DentitionComplicated by a Mesiodens. International Journal of Clinical Pediatric Dentistry. 2015;8(3):234–8.
7. Dias GF, Hagedorn H, Maffezzolli MDL, Silva F de F da, Alves FBT. Diagnosis and treatment of supernumerary teeth in the pediatric clinic - case report. Revista CEFAC. 2019;21(6).
8. . Qamar, Ch & Bajwa, Javed & Rahbar, Muhammad. (2013). Mesiodens-etiology, prevalence, diagnosis and management. Pakistan Orthodontic Journal. 5. 73-76.
9. Wang XP, Fan J. Molecular genetics of supernumerary tooth formation. Genesis. 2011;49(4):261-77
10. Thimmegowda U, Venkatahanumaiah S, Chikkanarasaiah N, Krishnamurthy NH. Mesiodens with Supernumerary Root in a Non-Syndromic Child: A Rare Case with Unusual Morphology and its Management. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2022;
11. Mufeed A, Hafiz A, Ashir KR, Ahmed A, Reshma VJ. Clinical consequence of mesiodens–A case series. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2016;28(3):259-62
12. Humerfelt D, Hurlen B, Humerfelt S. Hyperdontia in children below four years of age: A radiographic study. ASDC J Dent Child. 1985;52:121-24.
13. Kirtaniya BC. Tuberculate Supernumerary Teeth and Its Management-A Rare Case Report. Journal of Dental Health, Oral Disorders & Therapy. 2017 Apr 24;7(2).
14. Sockalingam SNMP, Zakaria ASI, Khan KAM, Azmi FM, Noor NM. Simple Orthodontic Correction of Rotated Malpositioned Teeth Using Sectional Wire and 2×4 Orthodontic Appliances in Mixed-Dentition: A Report of Two Cases. Case Reports in Dentistry. 2020 Jul 1; 2020:1–5.