Delayed eruption of maxillary permanent central incisors due to bilateral tuberculate supernumerary teeth: Case Report

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ABSTRACT

The purpose of this case report is to discuss the delayed eruption of permanent maxillary central incisors in a 10-year-old boy with retained primary maxillary central incisors. Radiological investigations revealed the presence of impacted bilateral supernumerary teeth and impacted permanent incisors. These supernumerary teeth were surgically removed and were diagnosed as tuberculate type. The patient is on clinical and radiological follow up for spontaneous eruption of the permanent teeth.
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The presence of supernumerary teeth in the premaxillary region has been cited as the most common cause for delayed eruption of permanent maxillary incisors.[1-6] The dental literature, however, reveals several other causes of delayed eruption of permanent maxillary incisors, including tooth agenesis, tooth malformation or dilacerations, cysts or other pathological obstructions in the eruptive path, presence of a dense mucoperiosteum or submucosa that acts as a physical barrier to eruption; retained primary incisors that have become ankylosed; lack of space; or an association with certain syndromes.[7] It has been reported that 28% to 60% of the supernumerary teeth are associated with disruptive eruption of permanent teeth.[1,4,8-10]

A supernumerary tooth is additional to the normal series and can be found in almost any region of the dental arch.[11] The prevalence of supernumeraries is reported to be less than 1% in the primary dentition and approximately 2% to 4% in the permanent dentition.[12] The most common location of supernumerary teeth is at the premaxillary region.[13,14] There is no significant sex distribution in primary supernumerary teeth. Males, however, have been shown to be affected more in the permanent dentition than females.[8,13,15,16] Mitchell[15] reported a 2:1 ratio in favor of males in cases exhibiting permanent supernumerary teeth, while Luten[16] found a sex distribution of 1.3:1.

Supernumerary teeth are a developmental anomaly and arguably have originated from multiple etiologies. Several theories have been suggested for their occurrence, including the: phylogenetic theory[17]; dichotomy theory[18]; hyperactive dental lamina[19,20]; and combination of genetic and environmental factors.[20] According to the phylogenetic theory, hyperdontia is the result of the reversional phenomenon or atavism (evolutionary throwback). This theory has been rejected by many authors. The dichotomy theory suggests that a supernumerary tooth may develop from the complete splitting of tooth bud. The tooth bud splits into 2 equal or different-sized parts, resulting in 2 teeth of equal size or 1 normal and

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1 dysmorphic tooth, respectively. A hyperactive dental lamina is the most accepted cause for the development of the supernumerary teeth. It is suggested that supernumerary teeth are formed as a result of local, independent, and conditioned hyperactivity of the dental lamina. Hattab et al.[13] believe that hyperdontia is a disorder with a pattern of multifactorial inheritance originating from hyperactivity of dental lamina. Remnants of the dental lamina can persist as epithelial pearls or islands within the jaw. If the epithelial remnants are subjected to initiation by induction factors, an extra tooth bud is formed, resulting in the development of either a supernumerary tooth or an odontome. The presence of supernumerary teeth may be part of developmental disorders, including: cleft lip and palate, cleidocranial dysostosis, Gardner's syndrome, Fabry Anderson's syndrome, Ellis Van Creveld syndrome (chondroectodermal dysplasia), Ehlers Danlos syndrome, incontinentia pigmenti, and trichorhinophalangeal syndrome.[21]

Supernumerary teeth can be classified according to their location in the dental arch—mesiodens, paramolar and distomolar—or according to their morphological forms: conical, tuberculate, supplemental, and odontome.[15] A mesiodens is a supernumerary tooth located between the maxillary central incisors. A paramolar most commonly occurs in the interproximal space buccal to the maxillary second and third molars. A distomolar is a fourth permanent molar which is usually placed either directly distal or distolingual to the third molar. In the primary dentition, morphology is usually normal or conical. There is a greater variety of forms presenting in the permanent dentition.

A conical type of supernumerary tooth is peg-shaped and develops with root formation ahead of or at an equivalent stage to that of permanent incisors. It usually presents as a mesiodens and may occasionally be found high and inverted into the palate or in a horizontal position. It can result in rotation or displacement of the permanent incisor, but rarely delays eruption.[22] The tuberculate type of supernumerary possesses more than 1 cusp or tubercle. It is frequently described as barrel-shaped and may be invaginated. Root formation is delayed compared to that of the permanent incisors, resulting in a rudimentary root. Tuberculate supernumeraries are often paired and are commonly located on the central incisors' palatal aspect. Their width is equal to their length as a result of incomplete or total absence of root formation. They rarely erupt and are frequently associated with delayed eruption of the incisors.[22] The most common supplemental tooth is the permanent maxillary lateral incisor, but supplemental premolars and molars may also occur. Most supernumeraries found in the primary dentition are of the supplemental type and seldom remain impacted. Howard[4] lists odontoma as the fourth category of supernumerary teeth. Primosh[19] classified supernumerary teeth into 2 types, according to their shape, supplemental (eumorphic), and rudimentary (dysmorphic). The supernumerary tooth position can be recorded as between central incisors and overlapping and its orientation can be described as vertical, inverted, and tranverse.[6]

Clinically, supernumerary teeth are able to cause different local disorders, including, retention of the primary tooth; delayed eruption of the permanent tooth; ectopic eruptions, tooth displacements, follicular cysts, and other alterations requiring surgical or orthodontic intervention.[23] Foster and Taylor[22] found that tuberculate types more commonly produced delayed eruption, whereas conical types more commonly produced displacement of the adjacent dentition. Supernumerary teeth also may cause diastema, root resorption, malformations such as dilacerations, and loss of vitality of adjacent teeth.[24]

The purpose of this report was to describe the case of delayed eruption of permanent maxillary central incisors caused by impacted bilateral tuberculate supernumerary teeth.

CASE REPORT

A 10-year-old Indian boy reported to the Department of Pediatric Dentistry, Kothiwal Dental College and Hospital, Moradabad, Uttar Pradesh, India, with a complaint of retained primary maxillary central incisors. Medical and family histories were noncontributory. Intraoral examination revealed Class I mixed dentition and the presence of over-retained primary maxillary central incisors and unerupted permanent maxillary central incisors (Figure 1). A panoramic and occlusal radiograph revealed the presence of impacted supernumerary teeth and impacted permanent

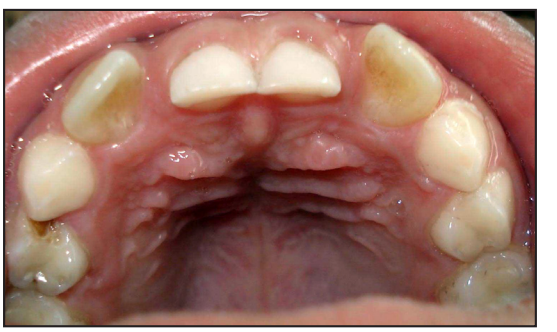

Figure 1. Intraoral view showing retained primary maxillary central incisors.

Figure 2. Orthopantomograph revealing the presence of impacted supernumerary teeth and impacted permanent central incisors.

maxillary central incisors (Figures 2 and 3). In the occlusal and periapical radiographs (Figures 3 and 4), the right central incisor appeared to have a distal root curvature in the apical third, which might be due to the presence of supernumerary teeth. The need for surgical removal of impacted supernumerary teeth to facilitate the eruption of permanent central incisors was explained to the patient and parents. A surgical procedure was carried out under local anesthesia and over-retained primary maxillary central incisors were extracted. The buccal flap was raised, some portion of bone was removed using a slow-speed bur with copious saline irrigation to show the presence of bilateral supernumerary teeth palatal to the impacted permanent central incisors. These supernumerary teeth were removed (Figures 5 and 6). The bone's margins were smoothed. The flap was sutured, and haemostasis was achieved. Upon visual examination, the supernumerary teeth appeared to be of the tuberculate type (Figure 7). The supernumerary teeth presented all the features of a tuberculate type with an invaginated crown without root formation, present palatal to the permanent central incisors bilaterally and causing delayed eruption (Figure 8).

Figure 3. Occlusal radiograph illustrating impacted supernumerary teeth and impacted permanent maxillary central incisors (1 week before surgery).

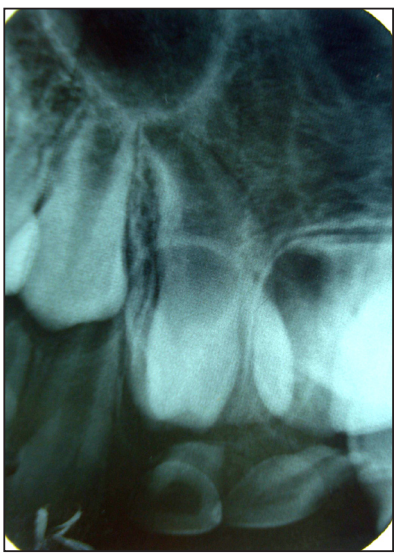

Figure 4. Intraoral periapical radiograph showing an impacted right central incisor with distal root curvature in the apical third.

DISCUSSION

Supernumerary teeth are considered one of the most significant dental anomalies during the primary and early mixed dentition stages and their detection is best achieved by thorough clinical and radiographic examination. Buccolingual position of unerupted supernumeraries can be determined using the parallax radiographic principle.[7,11] To avoid the complications of supernumerary teeth, extraction of these teeth is a general rule. Timing of surgical removal of supernumerary teeth also has been proposed. Two alternatives exist[24]:

1. Remove of the supernumerary as soon as it has been diagnosed. This could, however, create dental phobia problems for a young child and has been said to cause devitalization or deformation of adjacent teeth.
2. Leave the supernumerary tooth intact until root development of the adjacent teeth is complete. The potential disadvantages associated with this deferred surgical plan include:

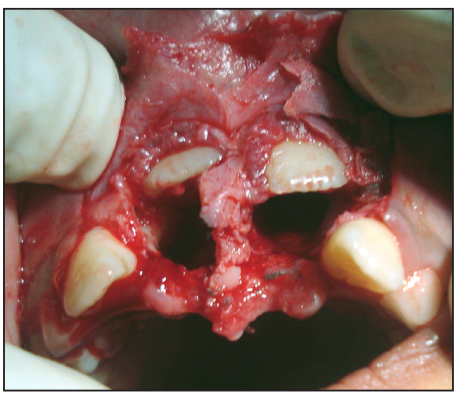

Figure 5. Surgical exposure of permanent maxillary central incisors after removing both impacted supernumerary teeth and extracting the retained primary maxillary central incisors.

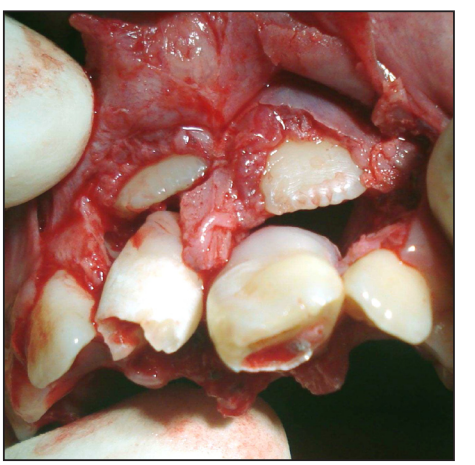

Figure 6. Supernumerary teeth placed back after removal to show their orientation in the bone.

Figure 7. Tuberculate supernumerary teeth after removal.

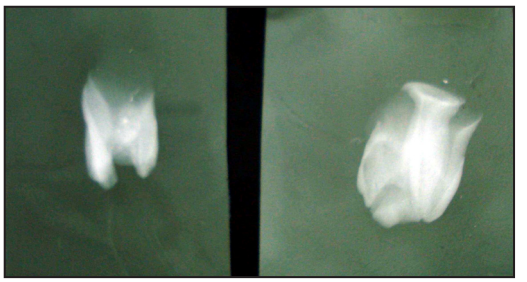

Figure 8. Periapical radiograph of tuberculate supernumerary teeth depicting invagination in the crown.

a. loss of eruptive force of adjacent teeth;
b. loss of space;
c. crowding of the affected arch; and
d. possible midline shifts.

According to Solares,[25] extractions during the early mixed dentition stage allow normal eruptive forces to promote spontaneous eruption of the permanent central incisors following extraction. Extraction of supernumerary tooth at a time appropriate for promoting self-eruption in the early mixed dentition may result in better alignment of the teeth and minimize the need for orthodontic treatment.[26] According to Hogstrom and Andersson,[24] early interventions are preferable to take advantage of the spontaneous eruption potential of the permanent incisors and to prevent anterior space loss and midline deviation. They also stated that early intervention (before 11-years-old) does not interfere with the development of adjacent immature teeth. Di Biase[27] recommended early removal only when tuberculated and inverted conical forms of supernumerary teeth interfere with the eruption of adjacent teeth.

Management of the delayed eruption of a tooth due to a supernumerary can be approached by any 1 of the following 3 methods[5]:

1. conservative management involving removal of the supernumerary only;
2. removing the supernumerary tooth along with the bone overlying the unerupted tooth with or without placement of a bonded attachment for orthodontic traction and replacement of the flap (closed exposure); and

Figure 9. Eight-month postoperative clinical photograph reveals an erupting left central incisor.

Figure 10. Eight-month postoperative occlusal radiograph shows occlusal movement of incisors.

3. removing the supernumerary and exposing the unerupted tooth, with or without placement of a bonded attachment for orthodontic traction (open exposure).

The dental literature also has repeatedly supported Di Biase's hypothesis that as long as there is sufficient space available, a tooth will erupt on its own.[27] Smailiene et al.[28] reported that when there was sufficient space in the dental arch, 64% of impacted incisors erupted spontaneously after removal of supernumerary teeth and the average time of spontaneous eruption of impacted maxillary central incisors after the supernumerary teeth removal was 16.05±9.3 (SD) months. Bodenham[1] observed a 79% spontaneous eruption rate of permanent impacted maxillary incisors in 20 months after supernumerary removal. Mason et al.[12] observed that more immature teeth erupted spontaneously after removing the supernumerary teeth vs mature teeth. They reported that 72% of impacted teeth with incompletely formed roots erupted spontaneously in patients with a mean (SD) age of 9 years 3 months.

Mitchell and Bennett[5] studied that 78% of impacted teeth erupted spontaneously, with a median eruption time of 16 months after removal of the supernumerary. If adequate space was available, or was created early, the median time for spontaneous eruption was reduced. Di Biase[29] and Leyland et al.[30] reported that most teeth experiencing delayed eruption will spontaneously erupt within 18 months of supernumerary removal alone and

eruption will occur even if there is significant root curvature as long as space is available.[29]

In the case presented, due to adequate arch space available and immature roots of the permanent incisors, it was decided to monitor the teeth for spontaneous eruption after surgical removal of supernumerary teeth. This was explained to the parents, and their consent was taken. Initial follow-up was conducted at 6 months; thereafter, monthly follow-ups were planned. An 8-month postoperative clinical examination revealed an erupting permanent maxillary left central incisor (Figure 9), and in the radiographic examination occlusal movement of both teeth is evident with still immature roots (Figure 10). The unerupted permanent tooth is being kept under clinical and radiological observation for spontaneous eruption. If this tooth does not start erupting within 16 to 18 months, then orthodontic eruption will be considered.

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