# Supernumerary teeth causing impaction of permanent maxillary incisors: consideration of treatment

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*The paper presents a discussion on etiology and treatment of maxillary central incisors impactions. Different treatment approaches which advocate teamwork approach, and importance of early diagnosis of such conditions is discussed.*
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## INTRODUCTION

Supernumerary teeth are developing anomaly in tooth number, and are common in humans. They may occur alone or in multiple, be unilateral or bilateral in maxilla or mandible or in both.[1] According to Proffit 90% of them are found in the anterior part of maxilla.[2]

The prevalence in general Caucasian population range between 2 to 2.65%.[3] There are two morphological types of supernumerary teeth: supplemented and rudimentary. Supplementary has shape of normal teeth, while rudimentary can have conical, barrel-shaped, tubercular, odontome, incisiform or some other shape.

Some of them never erupt, some of them can cause variety of problems and pathological disturbances in anterior maxillary region such as: over retention of primary teeth, delay eruption, or impaction of permanent incisors, bodily displacement or rotation, root dilaceration etc.

Numerous theories regarding etiology of supernumerary teeth has been proposed: atavism, excessive growth of dental lamina, dichotomy of the tooth germs, genetically determined condition,[4] however, definite etiogenesis remains unclear.

The most common cause of impacted maxillary incisors is the presence of supernumerary teeth. There is evidence that the tuberculate and odontomes types are more likely to impede the eruption of the permanent maxillary incisors than are the other types.[5,6]

This extra tooth impeding eruption of permanent incisors should be removed, to allow eruption of permanent incisors. In a case of lost space for accommodation of unerupted tooth, orthodontic treatment, to create space should be done, at the same time of extraction of the obstruction. If permanent incisor is too highly impacted, to bring it in the arch, orthodontic traction should be used. Timing of this procedure is quite controversial. Several studies have suggested that the younger age of the patient, the quicker the tooth eruption.[6,7] The other study suggested that the age of intervention has no effect.[8]

The article reviews literature on supernumerary teeth and by presenting two cases illustrates treatment considerations and alternatives.

## CASES DESCRIPTION

### Case number one

A boy, 11 years old, presented to the clinic with the mother. She was not happy with advice she got from a general practitioner, which was to wait for spontaneous exfoliation of the upper right primary incisor. (Figure 1)

Clinical examination revealed firm, retained upper right primary incisor and an erupted permanent lateral incisor on same side, and both permanent incisors on left side. In the mandible both permanent central incisors were erupted in the proper place, while on right side, lateral permanent incisor was erupted in transposed position with primary canines, on left side lateral permanent incisor was erupted in the proper place. All first permanent molars were fully erupted.

Radiographic examinations, panoramic and lateral teleradiograph, revealed supernumerary tubercular shaped tooth, situated above root of upper left primary incisor retaining permanent incisor high up under the floor of the nose (Figures 2, 3,). The root of the

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**Figure 1.** Frontal view of patient, boy 11 years old, showing present primary right maxillary incisor between fully erupted permanent first and second incisors on left side and lateral on right side.

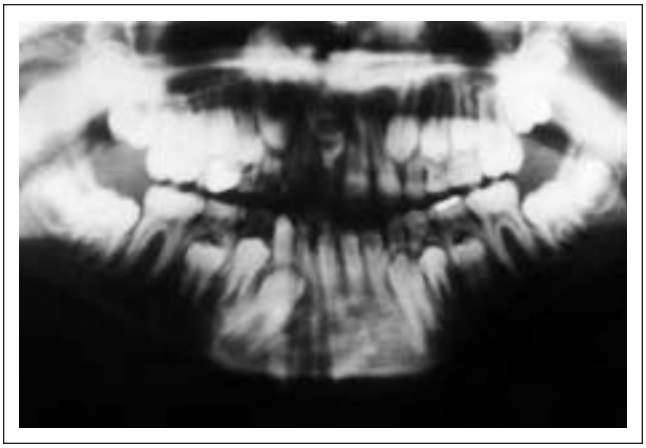

**Figure 2.** Panograph radiograph of same boy showing supernumerary tooth above primary right maxillary incisor.

**Figure 3.** Cephalogram of the same patient with clear picture of supernumerary tooth.

**Figure 4.** View of exposed maxillary right permanent central incisor after extraction of supernumerary tooth, with bonded bracket for traction.

**Figure 5.** Frontal view showing maxillary right central incisor being aligned after supernumerary was removed and mandibular lateral incisor after correction of transposition.

permanent incisor was more than half root developed. (according to Cvek classification of a root development was in class 4.)[4] In the mandibular left side, there was incomplete transposition of lateral permanent incisor with canine. In consultation with orthodontist and oral surgeon, the treatment plan was, to extract primary and supernumerary teeth, and bring the permanent incisor into normal position by orthodontic traction using closed-eruption technique.

Extraction of the primary tooth, surgical extraction of supernumerary tooth as well as exposure of impacted permanent maxillary incisor and bonding a bracket on the tooth was done atsame visit (Figure 4). The orthodontic bracket was engaged with 0.010-inch ligature wire. The flap was returned to the original location. The wire passed under the flap and exited at the midcrestal incision. Traction began through the closed flap, a week after surgery. It took us almost two years to bring tooth in normal position, vital, and without any sign of resorbtion (Figure 5).

**Case number two**

The second patient was a boy 8 years old. His chief complaint was un-eruption of upper left permanent central incisor (Figure 6). Past dental history revealed

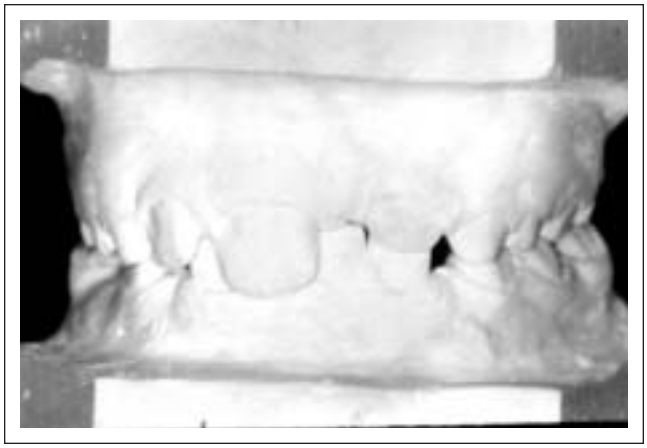

**Figure 6.** Frontal view casts of patient, 8 years old boy with nonerupted maxillary left central incisor.

that he was treated for one year previously with extraction of maxillary right primary incisor and surgical removal of two supernumerary teeth. The permanent tooth was left for spontaneous eruption, without maintaining space. Previous radiograph (Figure 7), (showing presence of two supernumerary above right central incisor already malposed, impeding his eruption.)

Clinical examination revealed lost space for the upper right permanent incisor, which was half occupied by permanent lateral incisor. On left side were fully erupted permanent incisors (Figures 8, 10).

In the mandible were present all permanent incisors as well as upper and lower permanent first molars. Radiographic examination revealed palatal impacted maxillary right central incisor rotated and malposed horizontally. Incisal tip of impacted incisor was positioned toward cervical area of central incisor from left side. A decision was made to bring the tooth into normal position through closed flap technique. Surgical flap has been raised. Round bur was used to find crown of impacted tooth. Curettes were used to uncover the crown, after overlying bone has been removed. One orthodontic bracket was bonded on impacted incisor. Orthodontic traction has begun immediately after flap replacement.(Figure 8). After six-months the tooth was brought labial, erupted in a malposed position (Figure 9).

Transition from primary to permanent dentition has prolonged time for derotation of erupted toot, (Figure 10) because of anchorage. De-rotation was going on well. The result (Figure 11) was very successful.

**Figure 7.** Periapical radiograph made at age of seven showing two supernumerary teeth and malposed permanent left central maxillary incisor.

**Figure 8.** Periapical radiograph showing beginning traction of impacted tooth.

## DISCUSSION

According to the literature[8] the most common cause of impaction of upper central incisors are tuberculate or odontoma-like supernumerary teeth, which was found in both patients. There is evidence[9] that impaction may be found more frequently in Asian population and in children with family history of anomaly teeth, suggesting dominant genetic factor in the appearance. We could not get that evidence of family history in each presented case, but both of treated patients were Asian, which can support the statement of greater incidence of supernumerary teeth in Asian population.

Most erupting anomalies can be prevented with proper treatment timing, and early diagnosis. Early diagnosis is based on thorough intraoral examination followed by radiographic analysis, preferably at an age

**Figure 9.** Occlusal view shoving appearing impacted tooth in malposed position.

**Figure 10.** Eruption advancing with slight derotation.

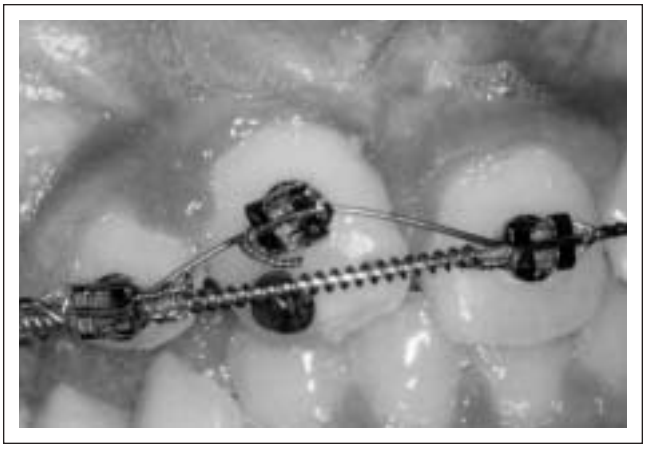

**Figure 11.** Derotated tooth.

of 6-8y.[10,11] In the first case, the patient was attending the dental clinic regularly. At the last visit the general practitioner after having periapical radiograph of that tooth, did suggested to parents to wait for spontaneous exfoliation of primary incisor even thought both maxillary lateral incisors and left central were erupted a long time ago.

It is recommended that one radiographic examination using a panograph if the contralateral incisor erupted more than 6 month previously, or if teeth which normal erupt after the incisors have already erupted.[12]

One earlier panograph could give an idea about what was going on in frontal area of maxilla, and save this patient from long orthodontic treatment. It looks-like that advice came from general practitioner was due to his misinterpretation of supernumerary tooth from periapical radiograph, as permanent tooth erupting soon.

Regarding the time and method of treatment of supernumerary teeth causing impaction of permanent teeth, there is quite a discrepancy between authors and schools. These approaches according Mitchell[14] can be summarized into three groups:

A: remove supernumerary teeth or tooth only.
B: removal of supernumerary teeth and bone overlying impacted teeth and replacements flap if the tooth is deeply placed or exposure if superficially placed.
C: remove supernumerary teeth and exposure of an unerupted tooth in all cases, with or without bonded attachment for orthodontic traction.

The second approach has the most followers. We support this approach for two reasons. First the greatest movement of the teeth is taking place prior to completition of root development. Secondly in a case of a displaced or impacted tooth/teeth, as was case in the second patient, an early guiding eruption will help proper positioning of the impacted tooth. If bonding and guiding the impacted tooth, while maintaining space during the first surgery of the previously mentioned patient, most probably the second surgery and a long active treatment would be avoided. This is particularly important because the root of impacted permanent incisor was not developed, and tooth itself was severely malposed.

Brands[8] mentioned that literature does not indicate, what is the optimal age for extraction of the supernumerary tooth? In his opinion rationale time is short time before normal eruption of permanent central incisor is expected to begin. Most authors agree that the time taken by the unerupted tooth to appear following removal supernumerary was between 6 months to 3 years. From our experience we recommended an earlier treatment with proper treatment planning.

Controversy surrounding early vs. late orthodontic treatment is often confusing to dental community, particularly for general practitioners.[14] This is obvious in treatment of supernumerary teeth. There is a "phenomena of 12 years". It comes from orthodontist's recommendation for the most cases to wait age of 12 for fixed orthodontic treatment. Some general practitioners believe as well as

parents that 12 years is a time for orthodontic treatment, meaning treating any child with an appliance or surgery regarding the teeth. Pediatric dentist sometime find difficulty to explain to parents that treatment of supernumerary teeth is a different issue.

Radiographic positioning of impacted teeth as well as supernumerary teeth, is very important step in treatment planing. Jacobs[15] has recommended special radiographic techniques for location of supernumerary and impacted teeth. Sometimes the number of supernumerary teeth is not shown clearly. Alvarez[16] has recommended special consideration regarding postoperative radiograph,

If the tooth is impacted in the middle of alveolus or higher as was case in first presented patient, the treatment of the choice is surgery. Close-eruption technique is strongly recommended, because of much more favorable outcome of periodontal status of exposed incisor after orthodontic treatment.[15-17]

According to Vermete[15] there is a theory that closed-eruption technique, imitate natural tooth eruption and produce the best esthetic and periodontal status. Our successful results support this statement.

So many factors should be taken in consideration before making final treatment plan. In the first place are the parents and compliance by the patient. It is surprising finding of Betis.[5,8] that some of patients refuse treatment of the unerupted permanent central incisors, accepting simple orthodontic and fixed prosthetic work instead of complicated orthodontic traction and surgery. We had experienced more ignorance from parents than from children.

According to Kupietzky[18] the team approach involving pediatric dentist, oral surgeon is very important for a successful outcome of the case described in his presentation. We fully agree with his statement. We can add our opinion that pediatric dentist contributing in correct patient management and decision making with orthodontist, referring to oral surgeon is guaranty of excellent patient care that facilitated successful clinical outcome.

The treatment of impacted maxillary incisors, which are of great concern in young patients for esthetic reasons, belongs to the most significant dental anomaly.[19] Teamwork is crucial. In our opinion the doctor in charge should be most probably pediatric dentist to ensure realization of original treatment plan made in the beginning. The opinion exist that permanent tooth should be exposed with or without bonding at the time of removal of supernumerary teeth.[4] Perhaps observation should be reserved as a mode of treatment only in very immature teeth, within a year of the eruption. Spontaneous eruption can be expected only in a case with incomplete root formation,[18] which we agree, but in a case of already displaced tooth as was case in our second patient, tooth repositioning has to start at the time of removal supernumerary.

There is apparent discrepancy between accepted UK orthodontic teaching and literature. Michel[14] stated that given sufficient time and space the majority of unerupted teeth prevented from eruption by supernumerary teeth will erupt spontaneously following extraction of obstruction. To accept this statement we need to see more well documented comparative studies between different methods of treatment. Evidence based dentistry is something which we are dealing now.[20]

When early signs of impaction of maxillary incisors are detected interceptive measurements have been recommended. Recently there are published results from a study on retrospective comparation between an interceptive and corrective treatments groups on palatal displaced maxillary canines. The results showed that about one third of corrective treatment group might have had a reasonably good chance of the canine eruption without corrective treatment if they had been diagnosed earlier and treated with interceptive treatment. Consequently authors concluded that initial diagnosis and interceptive treatment is in the responsibility of the general practitioner.[8,9]

They should be aware of the possibility of delayed eruption of permanent incisors. If there is any doubt about radiographic findings or how to proceed with treatment, the patient should be refered as early as possible for specialist advise.[19]

We do agree with this statement. Our recommendation is better teaching programs on this issue in dental schools. Impaction of maxillary central incisors due to supernumerary teeth is also in responsibility of pediatric dentists, and they also should detect early conditions that predispose one to develop malocclusion.

This is sensitive, lengthy and expensive treatment. Careful patient selection and preparation are essential, as is cooperation between orthodontist, pediatric dentist and oral surgeon.

## CONCLUSION

Early diagnosis of supernumerary teeth is based on thorough intraoral and radiographic examination at the age of 6 to 8 years.

If the supernumerary tooth/teeth interfere with eruption of permanent then supernumerary should be extracted at the time of detection, while maintaining space if necessary.

Spontaneous eruption should be expected only in very young teeth.

Treatment of supernumerary teeth requires careful treatment planing with multidisciplinary input.

One dentist, preferably pediatric dentist, should be in charge for treatment coordination in order to ensure proper follow-up of the original plan.

There is a need for broader education on this issue for general practitioners as well as pediatric dentist.

If permanent incisor is highly impacted, to bring into the arch, an orthodontic traction should be used.

Closed technique is recommended.

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