

Suffocated Maxillary Central Incisors (Surgical and Orthodontic Management): A Report of Two Cases

Dr. Barun Kumar Sah¹, Dr. Jamal Giri², Dr. Bandana Koirala³, Dr. Mamta Dali⁴, Dr. Sneha Shrestha⁵

¹Assistant Professor, Department of Pediatric and Preventive Dentistry, Tribhuvan University Dental Teaching Hospital, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal

²Associate Professor, Department of Orthodontics and Dentofacial Orthopedics, CODS, BPKIHS, Dharan, Nepal

³Professor, Department of Pedodontics and Preventive Dentistry, CODS, BPKIHS, Dharan, Nepal

⁴Associate Professor, Department of Pedodontics and Preventive Dentistry, CODS, BPKIHS, Dharan, Nepal

⁵Assistant Professor, Department of Pedodontics and Preventive Dentistry, CODS, BPKIHS, Dharan, Nepal

Corresponding author: Dr. Barun Kumar Sah; Email: drbarunsh@gmail.com

ABSTRACT

Clinically, supernumerary teeth are able to cause different local disorders and the most common one is impaction of maxillary incisors. Impacted maxillary incisors substantially affect esthetics, function, and self-esteem of patients. Impaction of maxillary permanent incisor is a rare clinical entity in dental practice. Although impaction of a permanent tooth is rarely diagnosed during the mixed dentition period, an impacted central incisor is usually diagnosed accurately when there is delay in the eruption of tooth. Multiple treatment options are available for impacted incisors. Surgical-orthodontic treatment is one of the alternative option for the correction. Early diagnosis and management of supernumerary teeth is important to prevent the need for more complex surgical and orthodontic treatment. Here, we present a report of two cases of impacted maxillary incisors and its management.

KEYWORDS: Delayed eruption, impacted incisor, orthodontic traction, surgical exposure, supernumerary teeth

INTRODUCTION

Tooth impaction is a condition in which a tooth fails to erupt into its normal functional position and remains un-erupted beyond the expected time.¹ The pediatric dentist often encounters some of the challenging situations like deviations from the normal eruption sequence, position or abnormalities in the morphology of the teeth. There are a series of factors that can influence the normal development of the occlusion and interfere in the correct alignment of the teeth and their harmonic relationship with the adjacent and antagonistic elements. The tooth impaction is a multifaceted phenomenon which encompasses local and systemic factors.^{2,3} Supernumerary teeth are considered to be a multifactorial inheritance disorder originating from hyperactivity of dental lamina. The incidence of supernumerary teeth is about 0.15 to 3.8% on a population basis with a predilection of 90 to 98% in maxilla, mostly occurring in the pre-maxillary region.⁴ The absence of maxillary incisors seems to be unattractive and this may have an effect on self-esteem and general social interaction. They are

also the teeth that are on maximum display during speech in most individuals and the normal eruption, position and morphology of these teeth are crucial to facial esthetics and phonetics. Thus, it becomes very important to diagnose and manage the problem as early as possible.⁵ Careful planning and interdisciplinary approach are required in the management of impacted central incisor.⁶ Here, we present a report of two cases where in first case supernumerary teeth is the cause of impaction and is managed by their surgical removal whereas in second case the cause of impaction may be the trauma and is managed by surgical exposure and orthodontic traction.

CASE REPORTS:

Case 1

A 12-year-old female patient reported to the Department of Pedodontics and Preventive Dentistry, CODS, B.P.K.I.H.S. with the chief complaint of non-eruption of teeth in the upper front teeth region noticed since loss of milk teeth. The patient had no any significant medical problem and had no any history of dental

trauma. There was neither positive family history of hereditary patterns of hyperdontia nor any systemic disorders in her family. The intra oral examination revealed absence of the permanent maxillary right and left central incisors but permanent maxillary lateral incisors were erupted on both sides (Figure 1). There was no apparent arch length discrepancy in both maxillary and mandibular arches. Bony hard swelling was present on upper labial aspect of 11, 21 which was non-tender on palpation. The maxillary occlusal view revealed the presence of impacted maxillary right and left central incisors with two supernumerary teeth superimposed on 11 and 21 (Figure 2). An intraoral periapical radiograph (IOPAR) of upper anterior region (SLOB technique) confirmed the labial position of the supernumerary teeth (Figure 3). The eruption status of the other permanent teeth was normal. Based on clinical and radiographic examinations, a provisional diagnosis of impacted maxillary central incisors due to supernumerary teeth was made. The need for removal of both supernumerary teeth was explained to the patient and parents to facilitate the eruption of permanent central incisors. The treatment plan included surgical removal of the supernumerary teeth and allow the eruption of impacted central incisors. However, the need for the fixed orthodontic treatment after complete eruption of the permanent teeth was explained for the correction of alignment. An informed consent was obtained from the parents. Under aseptic measures, adequate local anesthesia was achieved and full thickness muco-periosteal flap was reflected from distal aspect of 12 to 22 along with releasing incision distal to 12 and 22. Impacted maxillary central incisors and two supernumerary teeth were exposed (Fig 4). The latter were extracted (Figure 5), flap was repositioned, and suture placed (Figure 6). Post-operative instructions were given and medications prescribed. Patient was recalled after one week for suture removal and showed good post-operative wound healing (Figure 7). Patient was recalled after three months and evaluated clinically and radiographically which showed no signs of eruption of 11 and 12 (Figure 8). On seven months follow up, maxillary left central incisor was erupted, however maxillary right central incisor was not erupted but eruption bulge was prominent (Figure 9), so releasing incision was given to expose 11 (Figure 10). At 10 months follow up, complete eruption of both maxillary incisors were noticed (Figure 11). However, fixed orthodontic treatment was necessary for proper alignment and the parents were advised for the same and were willing to do it in near future.

Case 2

A 12-year-old female patient reported to the Department of Pedodontics and Preventive Dentistry, CODS, B.P.K.I.H.S. with the chief complaint of missing teeth in the upper front teeth region noticed since three to four years. The patient had no any significant medical problem and had a history of trauma to upper front milk teeth. There was no significant extra oral abnormality (Figure 12). The intra oral examination revealed absence of the permanent maxillary left central incisor with space loss (Figure 13) and Angle's Class I molar relation bilaterally (Figure 14 and 15). The permanent maxillary right central was erupted. The eruption status of the other permanent teeth was normal. The panoramic radiograph, maxillary occlusal view and IOPAR of upper anterior region confirmed that the maxillary left central incisor was impacted at mid root level of maxillary right central incisor (Figure 16, 17 and 18). A preliminary diagnosis of impacted permanent left central incisor was made. Although it is generally considered that deeply impacted incisor has a poor prognosis, we decided to surgically expose the tooth and bring it into the arch orthodontically because the parents wished to bring the impacted tooth down rather than extraction. The patient and her parents were informed about the possible complications like root resorption, perforation of the labial bone and therefore the subsequent need for canal treatment and apicoectomy.

The treatment was planned in three steps.

1. Creating space for the impacted maxillary left central incisor with fixed orthodontic treatment
2. Surgical exposure of impacted central incisor and
3. Traction of maxillary left central incisor, with special attention to the gingival recession.

Orthodontic treatment using a fixed appliance was initiated to gain space for the maxillary left central incisor. After initial alignment with 0.014" nickel-titanium archwire, space was gained between the maxillary right central incisor and maxillary left lateral incisor using a nickel-titanium open coil spring on a 0.018" stainless steel wire (Figure 19). After three weeks, the impacted maxillary right central incisor was exposed under local anesthesia, and a button was bonded on the labial surface for orthodontic traction (Figure 20). The traction of the maxillary left central incisor was started after seven days of surgery using a piggyback 0.014" nickel titanium wire (Figure 21). After two months of treatment, the maxillary left central incisor emerged into the oral cavity (Figure 22), making it possible to bond a bracket on the labial surface of the tooth. Orthodontic traction using a light continuous force was continued

for another five months till the tooth was brought in the dental arch. At this point, 0.019" x 0.025" stainless steel arch wire was used for proper torque expression on the maxillary left central incisor. There was some gingival recession with respect to the impacted tooth but it was not visible during smile due to patients' average lip line (Figure 23). We advised periodontal surgery to the patient to address the gingival recession, however, the patient was not bothered and declined our suggestion. The patient's extra oral appearance was quit acceptable (Figure 24)

DISCUSSION

Impaction of maxillary permanent incisors occurs in 0.2-1% of the population. The early referral of patients in the mixed dentition is common due to concern of parents and general dentists regarding delayed eruption of the permanent maxillary central incisors.⁵ It is not only the mere presence of a supernumerary tooth that predisposes a tooth to delayed eruption. Their shape, number and position are some other determining factors that can play a role in the fate of the incisor eruption.² Conical type of supernumerary tooth can result in rotation or displacement of the permanent incisor, but rarely delays eruption. The tuberculate type rarely erupt but frequently delay the eruption of incisors⁷ which is seen in our first case.

Supernumerary teeth can de-lay or prevent eruption of central incisors in 26 to 52% of cases; cause ectopic eruption, displacement or rotation of a central incisor in 28 to 63% of cases; and labially displace incisors in 82% of cases. Complications involving the supernumerary tooth itself include eruption of the supernumerary tooth into the nasal cavity and development of a dentigerous cyst which has been reported in 4 to 9% of cases. Most supernumerary teeth remain impacted, but in approximately 25% of cases eruption occurs.⁷

In 56-60% of cases, pre-maxillary supernumerary teeth cause impaction of permanent incisors due to direct obstruction for eruption, tipping of adjacent teeth towards the place of impacted tooth, narrowing of the dental arch, displacement of the permanent teeth bud, or malformations of the unerupted tooth root.⁸ Spontaneous eruption of impacted maxillary central incisors is affected by a lot of factors like axial inclination of impacted teeth, lack of space in the dental arch, degree of root formation, relation to the adjacent teeth roots, initial vertical position of impacted tooth. Spontaneous eruption of impacted maxillary incisors occurs in 54-76% of cases when supernumerary tooth is removed provided there is enough space in the

dental arch. However, research data indicate that the spontaneous eruption of impacted maxillary incisor may take up to 3 years, sometimes requiring orthodontic treatment to achieve adequate alignment of the erupted teeth in the dental arch⁸ but here, in the first case the impacted teeth erupted within one year after removal of the supernumerary teeth.

Both the technical skill and adequate knowledge of eruption status, growth and developmental aspects of adjacent teeth and soft tissues is required for the management of impacted teeth in children.⁴ Careful planning and interdisciplinary approach are required in the management of impacted central incisor. Successful management of impacted central incisor is a real clinical challenge as there are chances of failure due to ankylosis, loss of attachment, external root resorption, and root exposure after orthodontic traction. Improper surgical technique for flap design may lead to crown lengthening and loss of attachment which is functionally and esthetically unacceptable which advocate the need of periodontal surgery.⁶

The literature shows various options for a clinical solution to impacted upper incisors, which range from conservative procedures to surgical procedures followed or otherwise by orthodontic traction. On the other hand, it should be emphasized that before any radical intervention such as surgical exposure, it would be prudent to create sufficient space, stimulating the natural eruption of the incisors⁹ which was done in the second case here as there was limited space for the impacted maxillary incisors to erupt.

When an impacted central incisor is brought into the arch, there might be a discrepancy between the gingival height and that of the adjacent incisor. The light forces are more effective than heavy forces in moving the impacted and un-erupted teeth and providing good gingival position and contour.² In the second case, the force applied on the tooth was light and continuous that helped to provide an acceptable gingival contour and sufficient width of attached gingiva after orthodontic treatment. Some amount of gingival recession present could be attributed to the labial placement of the impacted tooth. The esthetic outcome determines the success of the orthodontic treatment. The finding in both the cases here are in agreement with the statement of Sarver and Ackerman¹⁰ when they stated that the upper incisors are the key to esthetic success in orthodontic treatment.

The current treatment modality instead of extraction has used the surgical crown exposure with the

placement of an auxiliary followed by orthodontic positioning of the tooth. The second case presented here used the closed-eruption surgical technique which elevates a flap and returns it back to the original location after an attachment on the impacted tooth through the coronal part of the flap. It is also believed that the closed eruption method replicates natural tooth eruption and therefore produces the best esthetic and periodontal status¹¹ which is seen in our second case. Combined surgical and orthodontic procedures can be a good option to treat impacted teeth in young patients with good aesthetic and functional results. The overall success rate was around 90% when orthodontic-surgical modality was used for the impacted incisors by Chaushu et al¹². Although the prognosis for orthodontic-surgical treatment of impacted incisors is good, the incisors with dilacerated roots have not so good prognosis. Treatment times were significantly affected

by the initial height of the impacted tooth. Although the initial height of the impacted tooth in our second patient was at the mid root level of the adjacent erupted central incisor, the orthodontic-surgical treatments were successful.

CONCLUSION

In both of the cases presented here, the impacted central incisors were successfully guided to its designated place by removing the barrier for eruption and by closed-eruption technique. Both the cases showed good stability. The presence of multiple supernumerary teeth in young children should be diagnosed early to provide appropriate intervention and to prevent any future complications. The long term monitoring for the stability and periodontal health is very important after orthodontic traction.

Case One:



Figure 1: Intra oral frontal view showing missing 11 and 21

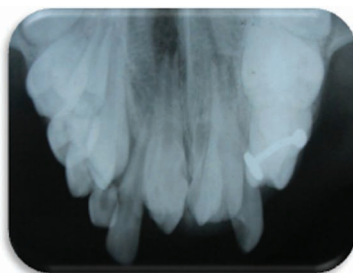


Figure 2: Maxillary Occlusal View



Figure 3: IOPAR with SLOB technique



Figure 4: exposure of impacted supernumerary and maxillary incisors



Figure 5: Extracted supernumerary teeth



Figure 6: After suture placement



Figure 7: After suture removal (one week)



Figure 8: After three months follow up



Figure 9: Eruption of 21 and eruption bulge of 11 after seven months follow up



Figure 10: Releasing incision to expose 11



Figure 11: complete eruption of 11 and 21 after 10 months

Case Two:



Figure 12: Extra oral frontal view



Figure 13: Missing 11 with space loss



Figure 14 and 15: Angle's Class I molar relation bilaterally

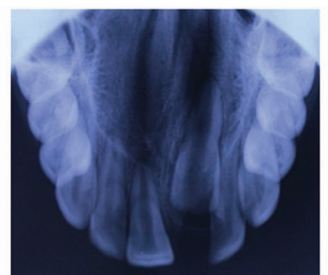
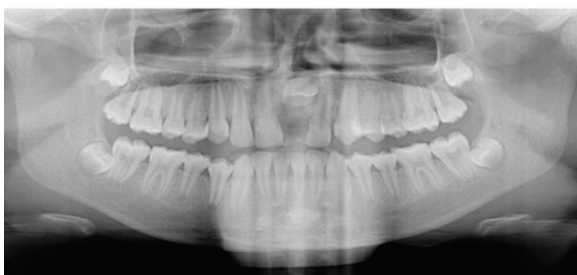


Figure 16, 17 and 18: Pre-treatment radiographic records



Figure 19: Space opening for traction of impacted central incisor



Figure 20: Lingual button bonded for orthodontic traction



Figure 21: Traction of impacted central incisor



Figure 22: Bracket bonded for traction of impacted central incisor



Figure 23: Alignment of impacted central incisor after orthodontic traction



Figure 24: Post-treatment frontal view

REFERENCES

1. Pal S, Biswas R, Galui S, Mukhopadhyay S. Management of Impacted Primary Maxillary Central Incisor: A Report. *Int J Pedod Rehabil* [Internet]. 2019;4(1):37–40. Available from: <http://www.ijpedor.org>
2. Yeluri R, Hegde M, Baliga S, Munshi AK. Multiple supernumerary teeth associated with an impacted maxillary central incisor: Surgical and orthodontic management. *Contemp Clin Dent* [Internet]. 2012;3(2):219–22. Available from: [/pmc/articles/PMC3425112/?report=abstract](http://pmc/articles/PMC3425112/?report=abstract)
3. Katsikogianni EN, Arqub SH, Chandhoke T, Giannakopoulos NN, Barbosa-Liz DM. Dental features and treatment findings of impacted maxillary central incisors: A multicenter study. *Int J Orthod Rehabil* [Internet]. 2019;10(1):1–9. Available from: <http://www.orthodrehab.org/text.asp?2019/10/1/1/253276>
4. Gupta S, Marwah N. Impacted Supernumerary Teeth—Early or Delayed Intervention: Decision Making Dilemma? *Int J Clin Pediatr Dent* [Internet]. 2012;5(3):226–30. Available from: <https://pubmed.ncbi.nlm.nih.gov/25206175/>
5. Pavoni C, Mucedero M, Laganà G, Paoloni V, Cozza P. Impacted maxillary incisors: diagnosis and predictive measurements. *Ann Stomatol (Roma)* [Internet]. 2012;3(3–4):100–5. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3555464>
6. Khera AK, Rohilla A, Tandon P, Singh GP. Orthodontic management of impacted central incisor: A clinical challenge. *J Indian Orthod Soc* [Internet]. 2017;51(1):46–50. Available from: www.jios.in
7. 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. *Int J Clin Pediatr Dent* [Internet]. 2011;4(3):255–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/27678238/>
8. Smaliene D, Sidlauskas A, Bucinskiene J. Impaction of the central maxillary incisor associated with supernumerary teeth: Initial position and spontaneous eruption timing [Internet]. Vol. 8, *Stomatologija, Baltic Dental and Maxillofacial Journal*. 2006. Available from: <https://pubmed.ncbi.nlm.nih.gov/17322650/>
9. Machado AW, Maia LGM, Vianna AP, Gandini Junior LG. Orthodontic traction of impacted upper central incisors related to mesiodens. *RGO - Rev Gaúcha Odontol* [Internet]. 2015;63(1):75–80. Available from: <http://dx.doi.org/10.1590/1981-8637201500010000111548>
10. Sarver DM, Ackerman JL. Orthodontics about face: The re-emergence of the esthetic paradigm. *Am J Orthod Dentofacial Orthop* [Internet]. 2000;117(5):575–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/10799119/>
11. ME V, VG K, DB K. Uncovering labially impacted teeth: apically positioned flap and closed-eruption techniques. *Angle Orthod* [Internet]. 1995;65(1):23–32. Available from: <https://pubmed.ncbi.nlm.nih.gov/7726459/>
12. Chaushu S, Becker T, Becker A. Impacted central incisors: Factors affecting prognosis and treatment duration. *Am J Orthod Dentofac Orthop* [Internet]. 2015;147(3):355–62. Available from: <https://pubmed.ncbi.nlm.nih.gov/25726403/>