



Research Article

TREATMENT OF BILATERALLY IMPACTED MAXILLARY CENTRAL INCISORS: SURGICAL EXPOSURE AND ORTHODONTIC TREATMENT

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ARTICLE INFO

Article History:

Received 1st September, 2023

Received in revised form 18th September, 2023

Accepted 15th October, 2023

Published online 28th October, 2023

Keywords:

Orthodontic treatment, Incisors.

ABSTRACT

This case report describes the treatment of a patient with his maxillary central incisors impacted along with 2 impacted supernumerary teeth. Due to the 4 impacted teeth in the anterior region, a two-stage treatment plan was developed. In the first stage, the impacted supernumerary teeth were extracted. The second stage involved the surgical exposure and traction of the impacted central incisors with the fixed 2x4 orthodontic appliance. At the end of the treatment, the patient had a normal and stable occlusion along with an adequate width of the attached gingiva

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INTRODUCTION

Impaction of maxillary central incisors is not a common finding in mixed dentition. It is usually diagnosed when they fail to erupt for a long time. The maxillary central incisor impaction can cause major problems at an early age.⁵ The prevalence of maxillary central incisor impaction ranges from 0.06-0.2%. The maxillary incisors are the most prominent teeth in an individual's smile, they are also the teeth that are on maximum display during a speech and the normal eruption, position, and morphology of these teeth are crucial to facial esthetics and phonetics. The eruption age for a maxillary central incisor is usually 7-8 years of age.¹ Any delay in its eruption may even cause an impact on the eruption of other teeth. (Canines, lateral incisor). The impaction of the maxillary central incisors is almost as prevalent as that of canines.. The principal factors causing the impaction of maxillary central incisors can be trauma to the deciduous central incisor resulting in developmental disturbance of the permanent tooth bud, presence of supernumerary tooth/teeth, or odontomas and cyst causing hindrance in the path of eruption of the permanent central incisor, position, and direction of the tooth, age of the patient, dilaceration, etc. Successful management of an impacted Central incisor is really a clinical challenge because there are chances of failure due to ankylosis, loss of attachment, external root resorption, and root exposure after orthodontic retraction. Improper surgical technique for flap design may lead to crown lengthening and loss of attachment which is functionally and esthetically unacceptable and needs to undergo periodontal surgery.

There are various treatment options for impacted central incisors which include extraction and restoration with a bridge or an implant later after cessation of the growth; extraction and closure of the space by substituting the lateral incisors for central incisors and surgical exposure, orthodontic space opening and traction of the impacted central incisors to its proper position. Our goal should be to minimize trauma to the dentition and periodontium.

Surgical exposure followed by orthodontic intervention is the most widely accepted solution for impacted central incisors. Nickel-titanium wire is a flexible wire used to deliver a constant force while simultaneously minimizing the side effects of a stainless steel archwire. This article presents a case of surgical exposure and orthodontic traction of impacted both the central incisors after surgical exposure of impacted incisors in a 13years old child with a fixed 2x4 orthodontic appliance.

CASE REPORT

History and diagnosis

A 13-year-old male patient reported to the department of Pediatric and Preventive Dentistry, K.D. Dental college and hospital, Mathura with a chief complaint of missing teeth in the upper front tooth region. There was no significant Past medical or dental history.

The child was physically healthy and had no history of medical and dental disease. On extraoral examination, her face was bilaterally symmetrical with a concave lateral profile. An intra-oral examination revealed the absence of maxillary

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central incisors. The patient had Angle's class III molar relationship bilaterally.



Fig. 1 Preoperative

Radiographic Examination

CBCT (Fig.2), Panoramic (orthopantomogram or OPG) (Fig.3), and periapical radiographs were taken to establish a good idea about the position and morphology of unerupted central incisors in the maxilla. CBCT revealed the presence of impacted supernumerary teeth along with impacted maxillary central incisors. The right maxillary central incisor was positioned over the permanent lateral incisor and was dilacerated. The left central incisor was placed vertically. The CBCT and panoramic radiograph demonstrated both maxillary central incisors were impacted due to the presence of two impacted supernumerary teeth located in their eruption path. The supernumerary teeth were placed palatally between the crowns of the impacted central incisors.



Fig. 2 CBCT

Diagnosis

- Impacted supernumerary teeth irt 11, 21
- Impacted central incisors irt 11, 21

Treatment Plan

The treatment plan consisted of 2 stages; in the first stage, the impacted supernumerary teeth extraction was planned. The second stage involved the surgical exposure and traction of the

impacted central incisors with the fixed 2x4 orthodontic appliance.



Fig.3 OPG

Treatment

LA was administered to the patient. Infra-orbital, Nasopalatine blocks, and local infiltration were administered. Incisions were given irt 13 to 23 (canine to canine). A palatal flap (Fig.4) was raised with the help of a periosteal elevator. Bone cutting was done to expose the embedded teeth. The impacted supernumerary teeth were then extracted (Fig.5) (irt 11, 21). P5



Fig. 4 Palatal flap was raised



Fig.5 Extractions of Supernumerary Teeth

The exposed site was well irrigated with betadine and sutures were placed. The patient was prescribed antibiotics, analgesics, and mouthwash along with the post-operative instructions and was recalled after 10 days for suture removal.

After 10 days sutures were removed. The labial flap was raised under LA to expose the impacted incisors (Fig-6).



Fig.6 labial flap was raised to expose impacted incisor



Fig.7 MBT brackets bonded on the incisors

Brackets were placed (Fig-7) on the labial surface of the impacted incisors, lateral incisors, canines, and molar tube was placed in respect to maxillary 1st molars followed by the placement of 0.12 NiTi wire in the maxillary arch (Fig-8). Loose sutures were placed irt 11, and 21. The patient was then recalled after 1 month and wire was then changed. 0.14 NiTi wire was placed (Fig-9).



Fig.8 Placement of 0.12 Niti wire



Fig.9 After 1 month 0.14 wire placed and bite was raised

The patient also had a crossbite so, the bite was raised with composite placement on the mandibular posterior teeth. After 3 months NiTi wire was changed to 0.16(Fig-10). The central incisors had erupted.after 7 months. The wires and brackets were removed and a lingual retainer was given.(Fig-11)



Fig.10 After 1 month 0.16 wire placed



Fig.11 The wire was removed, brackets were debonded and a lingual retainer was placed



Fig.12 Frontal View



Fig.13 Maxillary Occlusal View

RESULT

The maxillary central incisors were brought into an acceptable position (fig-12,13). Adequate overbite, overjet, and intercuspation were achieved. Well-interdigitated Class I canine and molar relationships were attained. There was a significant improvement in the patient's smile, and the final appearance of the teeth was aesthetically pleasing with similar clinical crown sizes. After the treatment, the repositioned incisors had an acceptable gingival contour and width of the attached gingiva.

DISCUSSION

Perfect alignment of impacted central incisors can be a challenging task but can be achieved by careful treatment planning. Several techniques have been developed as a choice of treatment for this scenario. If extraction of the impacted tooth is performed, it might lead to loss of alveolar bone. It may become thinner and deficient with time. Taking consideration of these disadvantages the main goal of the treatment becomes facilitation of eruption of the natural tooth and maintaining natural appearance. Therefore, the treatment of choice for impacted central incisors is surgical exposure followed by orthodontic approaches.

According to the literature about impacted central incisors, the prevalence is less than 1% (Machado et al. 2015); however, for the patient, it is quite disturbing from an esthetic and functional point of view.¹⁰ Early intervention is important in order to prevent complications in malocclusion and correct the relationship of malaligned or malpositioned teeth with their opposite and contralateral ones [Proffit, 2012].¹¹ Quinzi V. et. al, in a study, stated that Partial fixed treatment with the 2 x 4 appliance is a treatment option that helps in the early correction of simple and minor malocclusions such as rotation or malpositioning involving one or more teeth.¹²

The success of these cases depends of various factors;

1. the position and direction of the impacted tooth,
2. the degree of root completion,
3. the degree of dilacerations, and
4. the presence of space for the impacted tooth.²

Many techniques have been used for this purpose; special springs, removable and fixed appliances. In the present case, we have used the 2x4 appliance. It is a type of fixed appliance which is used to overcome the limitations of removable appliances Such as lack of patient cooperation, lack of retention, and proper activation. Fixed appliances do not

necessitate much patient cooperation. Other advantages of the fixed appliance include minimal discomfort, increase control of tooth movements, movement is possible in all the three planes. The appliance described is versatile, easy to use, and well-tolerated by all patients. The 2 x 4 appliance can be stated as partial fixed orthodontic treatment during the early stages to correct many malocclusions which are common during the mixed dentition period. Light continuous force was applied by using a small round Ni-Ti wire, allowing the teeth to shift without patient discomfort. 2x4 appliance provides a more effective and efficient positioning of teeth as it allows a three-dimensional control of the teeth to be corrected.¹² It can be a suitable option for correcting teeth with anterior crossbites, impacted incisors Rotations, diastemas, and incorrect tooth inclinations and angulations can also be treated with this appliance in mixed dentition period .

The extrusion of the impacted incisors can be done by two surgical methods; Open eruption and Closed eruption

OPEN ERUPTION: in this method, the tooth is exposed up to the coronal portion and the flap is replaced apically

CLOSED ERUPTION: in this method, the flap is raised, brackets are placed over the tooth and the flap is then sutured back into its original position

Studies have shown various advantages of the closed eruption method over the open eruption method. It has Better bone support, Less recession and Superior periodontal parameters¹. A study conducted by Becker et al. showed that closed eruption surgical exposure gives good esthetic results when compared with the unaffected side.¹³

The closed eruption method was used in our present case as it is more reliable when aesthetic and periodontal health is taken into consideration. Vermette et al. recommended the usage of the closed eruption technique when the tooth is positioned in the middle of the alveolus or high near the nasal spine³. In our case, an acceptable occlusion was achieved, and the periodontal status of the exposed incisor after treatment had an acceptable gingival contour and attached gingiva. No further mucogingival surgery was required. The patient was satisfied with the treatment.

CONCLUSION

Impaction of maxillary anterior teeth can be a challenging orthodontic problem. Early detection and intervention of such teeth is very important if complications are to be avoided. The treatment of an unerupted tooth will depend on its state, position, and presence of enough space in the dental arch to accommodate it. In the present case report, a 2X4 orthodontic appliance was used as an interceptive orthodontic treatment for the extrusion of impacted central incisors. This case report clearly demonstrates the versatility of using the 2X4 appliance. Even though there may be slightly more chairside time required to fit the appliance, there is no laboratory cost involved as with a removable appliance. Therefore, we can conclude that a 2X4 appliance can be a good treatment option for the correction of impacted teeth.

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How to cite this article: Poornima tripathi, Sonal Gupta, Simran Isha, Sakshi Patel., 2023, "Treatment of Bilaterally Impacted Maxillary Central Incisors: Surgical Exposure and Orthodontic Treatment. *International Journal of Current Advanced Research*.12 (10), pp. 2589-2593.
