Case Report

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Orthodontic-Surgical Management of Impacted Maxillary Central Incisor Related to Supernumerary Tooth: A Case Report

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Abstract

Anterior teeth play an important role in maintaining esthetics and phonetics in human beings. Missing anterior teeth might result in rotation, shifting, and root resorption of the adjacent teeth, loss of eruption space, underdevelopment of the anterior part of the maxilla, and crossbite. Adolescent patients are very conscious about how they look, and missing anterior teeth lowers their self-esteem. Due to the above reasons, missing anterior teeth should be managed as early as possible. The present case report highlights the orthodontic traction of the impacted maxillary central incisor caused by a supernumerary tooth. At the same time, the treatment outcome regained smile in an 11-year-old patient who had stopped smiling because his peers had started to call him by the name "toothless".

Keywords: Impacted incisor; Orthodontic traction; Supernumerary tooth.

Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: Informed consent was obtained from the patient for the publication of identifying features along with the manuscript.

Availability of data and materials: Data will be made available upon request.

Competing interest: None

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BACKGROUND

Anterior teeth play an important role in maintaining esthetics and phonetics in human beings. The prevalence of missing anterior teeth is 0.06 - 0.2% [1, 2]. Missing anterior teeth might be due to true anodontia or due to the delayed eruption of tooth/teeth caused by various factors like prolonged retention or early extraction of the preceding tooth, insufficient space, dilacerated root, alveolar clefts, presence of mechanical barriers like supernumerary tooth/teeth, thick mucosal tissue, scar tissue, cysts, and tumors, etc [1, 3 - 5].

Impaction of the maxillary central incisor may cause rotation, shifting, and root resorption of the adjacent teeth, loss of eruption space, underdevelopment of the anterior part of the maxilla, and crossbite [6]. In addition to this, maxillary incisors are the most prominent teeth in an individual's smile as they are on maximal display during speech in most individuals [7]. Hence, missing anterior teeth usually become the cause of low self-esteem in adolescents as they neither feel esthetically appealing nor normal looking [2, 8 - 10]. Sometimes due to self-consciousness or due to bullying by their peers, these children refuse to smile or even interact with their peers. The present case report highlights the management of an impacted maxillary central incisor caused due to a supernumerary tooth and regaining smile with confidence in an 11-year-old patient who had stopped smiling as his peers had started calling him "toothless".

CASE

An 11-year-old male patient reported to the Department of Pedodontics and Preventive Dentistry with the chief complaint of a missing upper front tooth. On examination and history taking, there was missing 21 **(Fig. 1A)** with the preceding tooth exfoliated at the age of seven years. There was no history of trauma, cleft of alveolus, or swelling in that region. Intraoral Periapical Radiograph (IOPAR) revealed impacted 21 with a supernumerary tooth which was also impacted **(Fig. 1B).** After obtaining assent from the patient and informed consent from his mother, surgical extraction of the mesiodens was done under local anesthesia (LA). Spontaneous eruption of the impacted 21 was expected after the extraction since there was adequate space for its eruption and the root formation was not completed. However, even after following up for one whole year the tooth (21) did not erupt and its space started decreasing gradually **(Fig. 2A).**

The treatment plan to regain the space for 21 followed by orthodontic traction was then made. The procedure was explained to the guardian and the patient, and space regaining was accomplished within a period of three

Figure 1. 1A: Missing 21, 1B: Pre-op: Intraoral Periapical radiograph showing impacted tooth and mesiodens.

months **(Fig. 2B).** This was followed by surgical exposure of the impacted tooth under LA **(Fig. 2C).** A lingual button was bonded on 21 and a ligature wire was tied to the button for orthodontic traction **(Fig. 2D).** The flap was closed using a 3-0 silk suture **(Fig. 2E).** A piggyback nickel titanium wire (0.014 inch) was used for orthodontic traction. The traction and alignment of impacted 21 was accomplished within a period of six months **(Fig. 3A, 3B, 3C, 3D).**

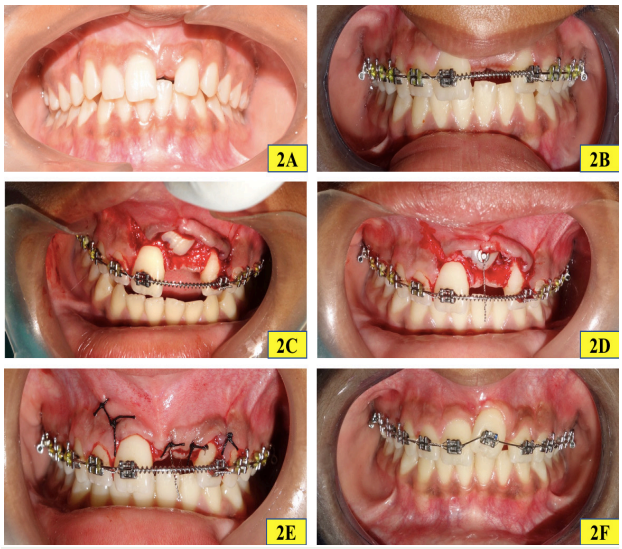

Figure 2. 2A: One-year follow-up photograph, 2B: After regaining space, 2C: Exposure of 21, 2D: Attachment of lingual button and ligature wire, 2E: Closure of the surgical flap, 2F: Five-month follow-up photograph.

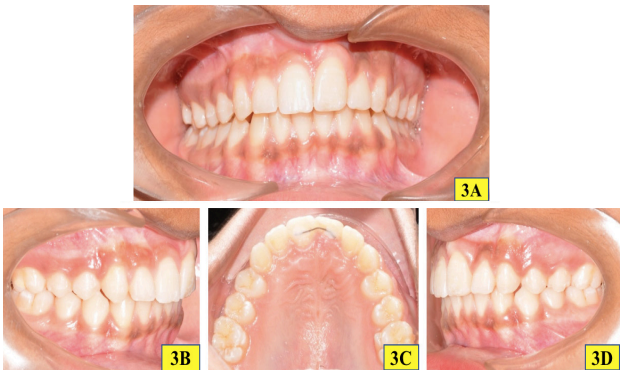

Figure 3. 3A, 3B, 3C, 3D: Photographs after completion of traction and alignment of 21.

DISCUSSION

Delayed or retarded teeth are usually characterized by the following conditions; when the teeth have not erupted within the normal chronology of teeth eruption, the contralateral tooth has been present in the mouth for over a period of six months, and no eruption even after more than three-fourths of root formation [1, 7, 11]. Delayed eruption can be attributed to many factors, and the presence of supernumerary is one of the commonest reasons for impaction and delayed eruption [3]. Presence of the supernumerary tooth has been found to cause impaction of permanent maxillary central incisor in 28-60% of the cases [8]. Impacted teeth are also associated with conditions like Apert syndrome, osteopetrosis, hypoparathyroidism, cleidocranial dysplasia, etc [3].

Mandibular third molars are the most commonly impacted teeth which are then followed by maxillary canines, mandibular second premolars, and maxillary central incisors [5]. In the case of impacted incisors, a multidisciplinary approach is generally required and treatment should start as early as possible [5, 12, 13]. Successful management of impacted central incisors is challenging as there are chances of failure due to ankylosis, loss of attachment, external root resorption, and root exposure after orthodontic traction [2].

Management options for impacted teeth include; extraction of the impacted teeth with subsequent prosthetic rehabilitation, removal of the mechanical barrier and space creation for spontaneous eruption, surgical exposure and orthodontic traction, and surgical repositioning. In day-to-day practice, removal of the mechanical barrier and space creation followed by orthodontic traction of the impacted teeth is the most desirable method. The reasons are that it preserves the natural tooth, is more predictable, is faster, and shows favorable functional and esthetic results with fewer complications. In this method, the treatment duration might be longer and there might also be the chance of traction failure, though minimal [3]. Another disadvantage of this method is the insufficient width of the attached gingiva resulting in an elongated clinical crown at the end of treatment [4].

There are two methods of traction: open eruption and closed eruption methods. In the open eruption technique, the flap is raised and an open window is left for the tooth to allow traction or eruption. Whereas in the closed eruption technique, the flap is raised, attachment components are installed and the flap re-closed. In the present case, the closed eruption technique was opted [14]. The proper flap design and direction of traction of the impacted tooth play a vital role in determining the amount of attached gingiva and the periodontal health of the retracted tooth [2, 4, 5]. The traditional approach of traction in the labial direction results in a decrease in the width of the attached gingiva due to which another method to perform traction in the palatal direction has been opted by many practitioners [4, 5]. In the present case as well, some amount of crown elongation was present as the traction was done in the labial direction.

If extraction of the impacted tooth followed by prosthetic rehabilitation is opted in young patients, provision of provisional prosthesis should be done which should then be followed by a definitive prosthesis like implants or fixed partial dentures when the patient reaches an appropriate age [3]. This method carries with it the disadvantages of the patient having to wait for several years for the final prosthesis along with the perception of having a "fake tooth". Surgical repositioning is usually opted for when the impacted tooth is positioned deep. This method carries with it the complications like root resorption, pulp necrosis, and arrest of root formation [3].

CONCLUSION

As maxillary anterior teeth hold significant importance in esthetics, function, and phonetics, missing anterior teeth should be investigated meticulously followed by prompt management. Since impacted maxillary anterior teeth are most commonly caused due to the presence of overlying supernumerary tooth/teeth, timely removal of the obstacle should be done which will facilitate for traction and proper alignment of the impacted tooth as in the reported case. In the case of adolescent patients, esthetics rather than other aspects plays a vital role in seeking treatment for missing anterior teeth. Traction of the impacted tooth in the present case significantly boosted the confidence of the patient.

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