

Orthodontic treatment of An impacted Central Incisor by The Closed-Flap Eruption Technique - A case report

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Abstract

The impacted maxillary central incisor in a child poses a disturbing esthetic dilemma to parents, by virtue of its location. Neither the orthodontist nor the parents prefer to wait for the fully erupted permanent dentition and comprehensive orthodontics to resolve this problem. This challenge can be met in the early mixed dentition stage by different surgical and orthodontic methods. It is important to maintain an adequate healthy gingiva in addition to aligning the tooth into the arch. This article illustrates a case report in which the impacted maxillary left central incisor was orthodontically managed by the closed-flap eruption technique.

Key words: impacted incisor, closed-flap eruption technique, gingiva.

Introduction:

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 the tooth. Many patients with impacted maxillary central incisors are referred to orthodontists by general practitioners or pediatric dentists because the parents are concerned about the impaction of an incisor in the early mixed dentition, even though its occurrence is less frequent.¹ Tooth impaction may result from a number of local causes. In an extensive review, Bishara² lists the etiologic factors of tooth impaction. Different surgical techniques have been reported in the literature like Gingivectomy, apically repositioned flap & closed-flap eruption technique. The type of impacted tooth and its location within the alveolus will dictate selecting the appropriate technique to uncover an impacted tooth.³

Labially impacted maxillary anterior teeth uncovered with gingivectomy or apically positioned flap technique, tend to have more unesthetic sequelae than uncovered with closed eruption technique. Negative esthetic effects like increased clinical crown length, increased width of attached tissue, gingival scarring and intrusive relapse were evident in the teeth treated with apically repositioned flap.⁴

Clinical Summary

A 9 yrs 8 months old girl reported to the Department of Orthodontics and Dentofacial Orthopedics, H. P. Govt. Dental College & Hospital Shimla (H.P.) with Parents chief complaint of missing one of the front teeth. The child was in good health and had no history of medical or dental trauma. On examination patient was in early mixed dentition stage with all permanent incisors erupted except left maxillary central incisor which exhibited adequate space (Fig.1a,b,c)



Fig 1a



Fig 1b



Fig 1c

On radiographic examination panoramic and occlusal radiographs demonstrated an impacted maxillary left central incisor (Fig 2a,b).



Fig 2a



Fig 2b

It was planned to surgically expose the tooth and attach a lingual button for orthodontic traction. Bands were placed on maxillary first molars and .022 edgewise brackets bonded to the remaining teeth anterior to the molar. Leveling was done with an .016 NiTi arch wire. A closed eruption technique was chosen and was performed under local anesthesia. A mucogingival

flap was reflected labially extending from right incisor to left deciduous canine. The bone and the follicular connective tissue covering the tooth was removed and area debrided well. Adequate amount of crown was exposed for bonding the orthodontic button with a ligature wire tied to it. The flap was closed after bonding the orthodontic button and the ligature wire was brought out by piercing through the attached gingiva and passively tied to the arch wire. After a week the healing was normal and the suture was removed. The ligature wire activated by deflecting the .016 NiTi arch wire. When the incisor crown was sufficiently visible (Fig 3a,b), it was bracketed and an .014 NiTi arch wire was used to align the incisor.



Fig 3a



Fig 3b

Final alignment and leveling is done with an .016x022 NiTi arch wire. Finally the arch was stabilized with an .017x025 S.S. wire (Fig 4) and after one month the bands and brackets removed except for the brackets of the central incisors. A sectional wire was ligated to serve as a retainer. (Fig 5) After six months the wire and brackets were removed from the central incisors. The patient was scheduled for regular follow up visits.



Fig 4



Fig 5

Discussion:

The surgical orthodontic treatment of an impacted tooth is aimed at bringing the tooth into correct position in the dental arch without causing periodontal damage. To achieve this goal, variety of surgical and orthodontic techniques have been proposed both in relation to the position of the impacted tooth and to the ligation technique used.^{5,6,7}

In case of a submucosal impaction, mucogingival problems may arise when performing a gingivectomy.⁸ However it has been suggested and shown that the window approach can lead to significant loss of attachment, recession and gingival inflammation on a maxillary tooth after surgical exposure.⁹ Therefore part of the keratinized gingiva must be preserved and apical repositioned flap should be used. This approach aims to establish keratinized gingiva around the entire erupting tooth.¹⁰ In the case of deep infraosseous impaction these techniques can not always be used safely and other steps are required to achieve a satisfactory periodontal outcome. A full thickness flap must be reflected to adequately access the crown of the impacted tooth. A satisfactory result may be expected if the physiologic eruption pattern is restored.^{3,4} On review of literature, a closed eruption technique was carried out in this case and the result shows not only the alignment of impacted left incisor in the arch but also healthy and esthetically similar gingival tissue as the adjacent tooth (Fig 6).



Fig 6

The panoramic and occlusal x-rays also demonstrate the final positioning of the tooth compares favorably with the adjacent central incisor. (Fig 7a, b)



Fig 7a

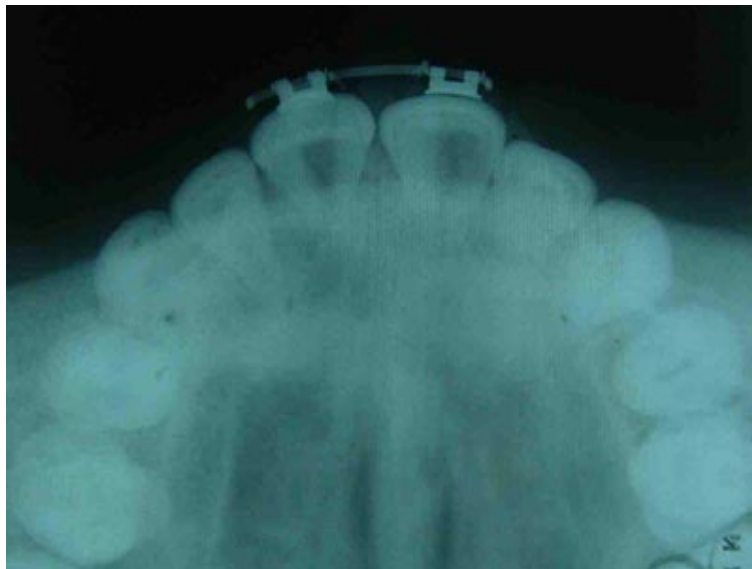


Fig 7b

Conclusion

The response to the technique was excellent. The patient now possesses confidence to smile and with enhanced self-esteem, which is critical even in early life.(Fig 8) The closed-flap eruption technique usually produces the best gingival esthetics.



Fig 8

Two potential problems can arise with the closed-flap technique if it is employed improperly:

1. Debonding of the bracket or button can occur if proper isolation and bonding technique are not used
2. If improper orthodontic mechanics are used, a mucogingival problem can result. If the tooth erupts through mucosa or too near the mucogingival junction, it may have inadequate attached gingival.

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