

Clinical Management of Impacted Dilacerated Maxillary Central Incisor: A Case Report

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ABSTRACT

Background: Impaction of maxillary permanent central incisor is not a frequently reported case in dental practice, but its treatment is challenging because of its importance in facial esthetics. Impacted incisor with dilaceration refers to a condition characterized by an angulation between crown and root causing non eruption of the incisor. Dilaceration can occur anywhere involving the apex of the root-resulting in disruption of the normal axial relationship of the tooth. The treatment options include either surgical removal of the impacted tooth or multidisciplinary approach involving surgical and orthodontic management. This paper describes the successful alignment of a horizontally impacted maxillary left central incisor positioned high in the vestibule, in a 15 year old male patient with combined approach of surgical exposure and spontaneous orthodontic traction force.

Keywords: Impacted central incisors, dilacerated root, surgical exposure, orthodontic traction.

INTRODUCTION

Impacted teeth are present in 1 to 5% of orthodontic patients. The most common causes are: lack of space for the eruption, prolonged bone retention barrier or early loss of deciduous teeth, abnormal position of the tooth to erupt, presence of alveolar cleft, ankylosis, neoplasias and root dilaceration.^[1] Maxillary central incisors have a significant impact on the esthetics of an individual.^[2] Although its impaction is infrequent, yet whenever it is impacted, it is a cause of concern toward the external appearance.^[3]

Dilaceration is a developmental anomaly of a tooth consequent to the trauma of its predecessor whose apex lies in close proximity to the permanent tooth germ.^[4] The treatment of a dilacerated tooth is a difficult task for an orthodontist because of its abnormal position and atypical shape.^[5] Orthodontic traction following surgical exposure is the usual procedure to salvage the impacted

dilacerated incisor while it may underlie complications such as ankylosis, external root resorption, and root exposure of a dilacerated impacted tooth which depends on the degree of angulation and direction of dilaceration.^[5,6]

DIAGNOSIS AND TREATMENT PLAN

A 15 year- old male patient reported to the Department of Orthodontics and Dentofacial Orthopaedics, Government Dental College And Research Institute Bengaluru with a chief complaint of unesthetic appearance due to missing left upper front teeth. The patient was physically healthy and no relevant medical and dental problems was ascertained.

Extra-oral examination revealed a symmetrical face with a convex profile, with competent lips, posterior divergence, negative lip step, acute nasolabial angle

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and shallow mentolabial sulcus. On intra-oral examination, there was Angle's class I molar relationship with missing permanent maxillary left central incisor (Fig 1).



Fig 1: Pretreatment extraoral and intraoral photographs showing missing maxillary left central incisor.

Panoramic and maxillary occlusal radiograph showed a highly placed impacted left maxillary central incisor with curved root (Fig 2). The tooth morphology and position were visible in the lateral cephalometric radiograph (Fig 3) showing horizontal displacement of the incisor. To ascertain the position of the tooth three-dimensionally and to find out the potential problems which may occur following orthodontic treatment, cone-beam computed tomography was performed which revealed the horizontally impacted incisor with a upward bend of the apical third of the root forming 90° with the long axis of the tooth (Fig 4).



Fig 2. A and B, Pre-treatment panoramic and maxillary occlusal radiographs showing impacted maxillary incisor.



Fig 3: Pre-treatment cephalogram showing dilacerated maxillary incisor.

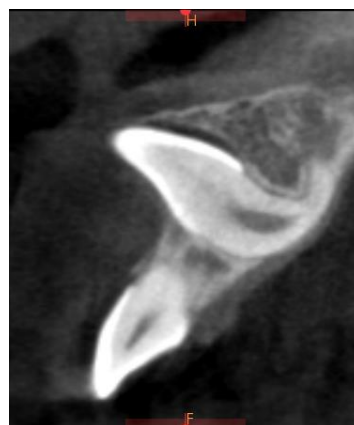


Fig 4: CBCT images of dilacerated impacted maxillary left central incisor.

TREATMENT ALTERNATIVES AND OBJECTIVES:

1. Surgical extraction of impacted central incisor followed by prosthetic rehabilitation after growth cessation.
2. Orthodontic space regaining in the maxillary arch for the impacted tooth followed by surgical exposure accompanied by orthodontic traction to bring the tooth into proper alignment.

The treatment options were described to the parents who consented for orthodontic tooth alignment.

TREATMENT PROGRESS

The treatment was accomplished in three stages:

Alignment and space regaining

The treatment was initiated using a fixed appliance (MBT 0.022 × 0.028 slot, AO, USA) to gain space for the left maxillary central incisor. The planned arch wire sequence started with 0.016" nickel-titanium,

0.018" stainless steel, 0.017×0.025" nickel-titanium followed by 0.019×0.025" stainless steel. A nickel-titanium open coil spring was placed between the right maxillary central incisor and left maxillary lateral incisor on stainless steel archwire.

Surgical exposure

After sufficient space was achieved, under local anaesthesia, surgical exposure of the impacted maxillary left central incisor was performed by an oral surgeon (Fig 5). The crown of the impacted tooth was displaced because of dilaceration. So a begg bracket was bonded over the palatal aspect of the crown and a pigtail wire (0.009" ss) was ligated to the bracket and continuous tractional force was applied.



Fig 5: Showing surgical exposure of impacted maxillary left central incisor.

Orthodontic traction

After 3 months the crown portion appeared in the oral cavity, then bracket position was changed to labial side and a piggy back of 0.016" nickel-titanium sectional wire was engaged into the bracket over a 0.018" stainless steel main archwire (Fig 6). The wire produced a light continuous force to bring the tooth closer to alignment. After 2 month of continuous traction, MBT bracket was placed on the labial surface of the crown and continued the tractional force using piggy back wire. Once the tooth was aligned a continuous 0.016" nickel-titanium wire, followed by 0.018"stainless steel, 0.017×0.025"nickel-titanium and 0.019×0.025" stainless steel wire were placed. There was a slight amount of anterior open bite which was corrected using anterior box elastic.



Fig 6: Orthodontic traction of the impacted central incisor.

Once the proper occlusion was achieved with the active treatment, the fixed appliance was debonded and fixed lingual bonded retainers were placed in both maxillary and mandibular arches.

TREATMENT RESULTS:

Continuation of three stages in concert resulted in the successful positioning of the impacted dilacerated maxillary left central incisor into proper alignment in the dental arch (Fig 7). The erupted incisor had higher gingival margin when compared to adjacent central incisor. A slightly larger crown height was observed. Gingivoplasty is recommended for the patient but the patient was satisfied and refused gingival recontour procedure. During treatment, the patient oral hygiene was not satisfactory resulting in cervical decalcification of the anterior teeth. Patient was advised to use CPP-ACP (Casein Phosphopeptide - Amorphous Calcium Phosphate) tooth mousse to reduce the extent of enamel decalcification. Panoramic radiograph revealed nearly parallel roots, slight amount of root resorption of the anterior teeth (Fig 8) and pulp testing showed a vital pulp. The total treatment duration was about 22 months.





Fig 7: Extraoral and intraoral photographs of the patient immediately after debonding.



Fig 8: posttreatment panoramic radiograph showing well aligned left maxillary central incisor and also some amount of root resorption.

DISCUSSION

The authors of most oral surgery textbooks consider surgical removal of a dilacerated, unerupted maxillary incisor the usual course of treatment.^[7] However, there are many successfully treated dilacerated impacted maxillary central incisor.^[5,8] Just as our patient showed, the dilaceration of the root is not a great obstacle, if the case is carefully planned and patient has a good compliance.

Most authorities agree that there are 2 possible causes of dilaceration. The most widely accepted cause is trauma.^[9] However, traumatic injuries cannot account for all cases of dilaceration, especially for those of deciduous teeth. An idiopathic developmental disturbance was proposed as another possible cause in patients with no clear evidence of trauma.^[10]

The treatment of dilacerated anterior teeth is always a clinical dilemma. Failure due to ankylosis, external root resorption, and root exposure after orthodontic traction is possible. However, in our patient, no obvious root resorption could be detected, indicating that, in the case of dilaceration, root resorption can hardly be predicted.

The treatment approach for impacted maxillary teeth requires close cooperation of dental specialties such as orthodontics, oral surgery. Studies have shown that, when more bone is removed during surgical exposure, there is greater bone loss after orthodontic treatment.^[11,12]

There are 2 other options for the treatment of dilacerated incisors cited in the literature: surgical repositioning^[13] and tooth autotransplantation.^[14] It is strongly recommended that all teeth that have not erupted 6 months after the normal eruption date should be examined radiographically to ascertain any possible cause for the delayed eruption.^[15,16] Intervention should begin as early as possible, so that normal root development can continue. The longer the tooth is retained, the poorer the prognosis for eruption, axial root growth and orthodontic traction.^[5]

Even in patient with severe dilaceration of the anterior teeth, where extraction of impacted tooth followed by prosthetic replacement or an implant is necessary, it is better to perform orthodontic traction initially to improve esthetics and also to improve the alveolar bone height.^[17]

CONCLUSION

Though orthodontic management of dilacerated impacted central incisor is challenging task because of considerable complication such as root resorption, ankylosis and root exposure, with meticulous diagnosis, treatment planning and proper biomechanics it is still achievable.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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