

Case Report

Orthodontic management of dilacerated impacted maxillary central incisor using closed eruption technique

ABSTRACT

An impacted incisor with dilaceration poses a clinical dilemma because of its difficult position. This case report describes the orthodontic management of impacted dilacerated maxillary left central incisor. Based on esthetic demand and patient compliance, orthodontic traction involving closed eruption technique was performed to achieve alignment of central incisor in the arch. Prudent application of biomechanics and radiographic evaluation at regular interval assisted in achieving good esthetic and patient satisfaction.

Keywords: Dilaceration, impaction, orthodontic traction

INTRODUCTION

Maxillary central incisors have a significant impact on the esthetics of an individual.^[1] Although its impaction is infrequent, yet whenever it is impacted, it is a cause of concern toward the external appearance.^[2] Multiple factors affect eruption of central incisors of which dilaceration is the usual etiology.

Dilaceration refers to an angulation anywhere along the length of the tooth, which may result in disruption of the normal eruption of the tooth.^[3] It 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 challenging for an orthodontist owing to its difficult 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]

Prognosis of a dilacerated tooth depends on the severity of dilaceration determined by measuring the angle formed by the midlines of the tooth long axis and the deviated segment. It has been classified as mild (20° – 40°), moderate (41° – 60°), and severe ($\geq 61^{\circ}$).^[7] Prognosis is good in mild cases, which

decline with increasing severity. This article presents a case of an impacted left maxillary central incisor with mild dilaceration, which was successfully moved into its proper position following orthodontic treatment.

DIAGNOSIS AND TREATMENT PLAN

A 14-year-old male child reported to the Department of Orthodontics and Dentofacial Orthopedics of our Institute with a chief complaint of unesthetic appearance due to missing left upper front tooth. The child was physically healthy, and no relevant history of medical or dental problems was ascertained.

Extraoral examination revealed a symmetrical face with a convex profile. On intraoral examination, there was Angle's class I molar relationship with missing maxillary permanent left central incisor, no apparent arch length discrepancy in

NAVNEET SINGH, TULIKA TRIPATHI, PRIYANK RAI, PRATEEK GUPTA

Department of Orthodontics and Dentofacial Orthopaedics, Maulana Azad Institute of Dental Sciences, New Delhi, India

Address for correspondence: Dr. Tulika Tripathi, Department of Orthodontics and Dentofacial Orthopaedics, Maulana Azad Institute of Dental Sciences, MAMC Complex, Bahadur Shah Zafar Marg, New Delhi - 110 002, India. E-mail: drtulikatripathi@yahoo.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Singh N, Tripathi T, Rai P, Gupta P. Orthodontic management of dilacerated impacted maxillary central incisor using closed eruption technique. Int J Orthod Rehabil 2018;9:123-6.

Access this article online	
Website: www.orthodrehab.org	Quick Response Code 
DOI: 10.4103/ijor.ijor_13_18	

both maxillary and mandibular arches [Figure 1]. Panoramic radiograph showed a high placed impacted left maxillary central incisor with curved root. 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 palatally impacted incisor with a distal bend of 30° from the long axis of the tooth at the middle of the root with complete apex formation [Figure 2].

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, Ormco Corp, CA, USA) to gain space for the

left maxillary central incisor. The planned archwires sequence started with 0.014" nickel titanium, 0.016" stainless steel, 0.017 × 0.025" stainless steel, and 0.019 × 0.025" stainless steel archwires. A nickel-titanium open coil spring was placed between the right maxillary central incisor and left maxillary lateral incisor on stainless steel archwires.

Surgical exposure

After sufficient space was achieved, surgical exposure was performed by an oral surgeon. Under local anesthesia, a full thickness mucoperiosteal flap was raised. The crown of the impacted tooth had normal enamel surface with no defects. Hence, the bracket was bonded, and pigtail wire (0.009" stainless steel) was ligated to the bracket [Figure 3]. The flap was repositioned and sutured to achieve closed eruption of the tooth with pigtail wire protruding through the mucosa.

Orthodontic traction

Orthodontic traction was started on the day of surgery with an overlay wire (0.014" nickel-titanium) attached to the pigtail. It produced continuous and light orthodontic force to bring the tooth into occlusion. Nickel-titanium open coil spring was kept in place over the base arch wire (0.019 × 0.025" stainless steel) to maintain the space regained. Reactivations were performed every 4 weeks until the tooth reached into occlusion. The periodic radiovisuograms were taken to check for impacted tooth position.



Figure 1: Pretreatment extraoral and intraoral photographs

After 8 months of traction, the tooth emerged into the oral cavity, and overlay wire was ligated into the main slot of the bracket of the dilacerated central incisor. The mandibular

arch was bonded with the fixed appliance. Once the proper occlusion was achieved with 20 months of active treatment, the fixed appliance was debonded and fixed lingual bonded retainers were placed in both maxillary and mandibular arches.



Figure 2: Pretreatment lateral cephalogram, Cone-beam computed tomograms and orthopantomogram



Figure 3: Intraoral photographs showing surgical exposure and forced eruption of impacted maxillary central incisor

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. The completely erupted incisor had an acceptable gingival contour with slightly longer crown height was observed [Figure 4]. Panoramic radiograph depicted no root resorption, and pulp testing revealed vital tooth [Figure 5].

DISCUSSION

The orthodontic treatment of dilacerated anterior teeth is always perplexing for clinicians.^[8] Careful planning and strategic implementation of biomechanics culminate in proper positioning of dilacerated impacted tooth in the arch. Although failures involving ankylosis, external root resorption, and root exposure is possible following orthodontic treatment, yet orthodontic traction should be applied to test the potential probability as surgical luxation has exhibited satisfactory results.^[5,6,8] Moreover, a natural tooth is always better and preferred over a prosthetic



Figure 4: Posttreatment extraoral and intraoral photographs



Figure 5: Posttreatment lateral cephalogram and panoramic radiographs

replacement, and sufficient gain in alveolar bone dimensions is not attained as with the eruption of a permanent tooth.

The method employed for surgical exposure of an impacted tooth is of prime importance for achieving good esthetic results. Window excision of soft tissues, apically positioned flaps and closed eruption techniques are common procedures for surgical exposure of an impacted tooth. Closed eruption technique was availed in our case as it is ideal for highly impacted maxillary incisor.^[9,10]

Orthodontic traction should be attempted in dilacerated impacted incisors with the committed approach, and assiduous monitoring as no significant root resorption has been reported in previous case reports with even horizontal or inverted impacted and dilacerated incisors.^[5,8] Hence, we ventured to bring the dilacerated impacted incisor in its position in the arch aided by periodic radiographs.

From mechanical perspective; an auxiliary archwire as used in our case, imparted freedom of movement of the impacted tooth without hindrance from adjacent teeth. After successful alignment of the impacted central incisor, further gingival recontouring was avoided as results were quite satisfactory to the patients and his parents.

CONCLUSION

Orthodontic traction of an impacted dilacerated maxillary central incisor should always be attempted from esthetic perceptive as compared to prosthetic replacement.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Shi X, Xie X, Quan J, Wang X, Sun X, Zhang C, *et al.* Evaluation of root and alveolar bone development of unilateral osseous impacted immature maxillary central incisors after the closed-eruption technique. *Am J Orthod Dentofacial Orthop* 2015;148:587-98.
2. Chaushu S, Zilberman Y, Becker A. Maxillary incisor impaction and its relationship to canine displacement. *Am J Orthod Dentofacial Orthop* 2003;124:144-50.
3. Shafer WG, Hine MK, Levy BM. *A Textbook of Oral Pathology*. 4th ed. Philadelphia: W. B. Saunders; 1983. p. 40.
4. Yeung KH, Cheung RC, Tsang MM. Compound odontoma associated with an unerupted and dilacerated maxillary primary central incisor in a young patient. *Int J Paediatr Dent* 2003;13:208-12.
5. Pavlidis D, Daratsianos N, Jäger A. Treatment of an impacted dilacerated maxillary central incisor. *Am J Orthod Dentofacial Orthop* 2011;139:378-87.
6. Topouzelis N, Tsaousoglou P, Pisoka V, Zouloumis L. Dilaceration of maxillary central incisor: A literature review. *Dent Traumatol* 2010;26:427-33.
7. da Silva, BF, Costa LE, Beltrão RV, Rodrigues TL, de Farias RL, Beltrão RT. Prevalence assessment of root dilaceration in permanent incisors. *Dent Press J Orthod* 2012;17:97-102.
8. Chang NY, Park JH, Kim SC, Kang KH, Cho JH, Cho JW, *et al.* Forced eruption of impacted maxillary central incisors with severely dilacerated roots. *Am J Orthod Dentofacial Orthop* 2016;150:692-702.
9. Sun H, Wang Y, Sun C, Ye Q, Dai W, Wang X, *et al.* Root morphology and development of labially impacted maxillary central incisors in the mixed dentition: A retrospective cone-beam computed tomography study. *Am J Orthod Dentofacial Orthop* 2014;146:709-16.
10. Vanarsdall RL, Corn H. Soft-tissue management of labially positioned unerupted teeth. *Am J Orthod* 1977;72:53-64.