

Case Report

Orthodontic management of missing maxillary central incisor

ABSTRACT

The maxillary incisors are the most frequently fractured teeth which hamper the esthetic, functional, and psychological aspects of an individual. Of the many treatment options available, orthodontic space regaining and prosthetic implant for the replacement of missing central incisor is the best multidisciplinary treatment approach. This case report describes a 19-year-old female patient who reported with crooked appearance of upper anterior teeth due to loss of space in the right central incisor tooth area. The patient was treated with prosthetic implant in the space restored by orthodontics.

Keywords: Disimpaction, interdisciplinary treatment, missing central incisor, prosthetic implant, space regaining

INTRODUCTION

The maxillary incisor tooth plays a critical role in esthetics, phonetics, and functional activities. Management of traumatic loss of the maxillary incisors during the early developing age is a quite challenging. The maxillary central incisor is the most frequently injured tooth (4%–49% prevalence) because of its morphology and location in the dental arch^[1,2] and its prevalence tends to increase until 10–12 years.^[3] In childhood, the traumatized and avulsed teeth with long-term edentulous space pose different situations such as drifting of adjacent teeth into the space, midline shift toward one side, overeruption of opposing tooth, unaesthetic gingival margin, decreased arch length, and tooth size discrepancy.^[4,5]

Various treatment options for replacing the missing tooth without loss of space includes immediate reimplantation of avulsed tooth,^[6] autotransplantation,^[7] or prosthetic rehabilitation during adulthood.^[8,9] In cases of complete loss of missing tooth, space includes either by regaining the lost space by orthodontics followed by restoration with bridge/ an implant or substitution and reshaping of the adjacent teeth.^[10,11] The selection of an appropriate treatment depends on the specific characteristics of each situation which demands a multidisciplinary approach.^[12]

This case report describes the treatment procedure in a patient who presented with missing maxillary right central incisor due to trauma; the treatment was completed by regaining lost space by orthodontic tooth movement followed by prosthetic replacement using implant (Equinox Myriad plus).

CASE REPORT

A 19-year-old female patient reported to the Department of Orthodontics with a chief complaint of irregularly placed upper front teeth. She had a history of avulsed maxillary right central incisor due to trauma at 10 years of age. Extraorally, she presented with orthognathic facial profile, symmetric face with interlabial gap of 2 mm. Intraorally, she revealed a Class I molar bilaterally, Class II canine relation, missing maxillary right central incisor tooth with closure of space, retained

CHAGAM REDDY MANJUNATHA, ARUN KUMAR DASARI, MOHAMMED MOINUDDIN ALI MIR, MIR HASAN ALI, KODIPELLY GOUTHAM

Department of Orthodontics, SVS Institute of Dental Sciences, Mahabubnagar, Telangana, India

Address for correspondence: Dr. Arun Kumar Dasari, Department of Orthodontics, SVS Institute of Dental Sciences, Mahabubnagar - 509 002, Telangana, India.
E-mail: dr.dasari.arun@gmail.com

Access this article online	
Website: www.orthodrehab.org	Quick Response Code 
DOI: 10.4103/ijor.ijor_37_17	

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: Manjunatha CR, Dasari AK, Ali Mir MM, Ali MH, Goutham K. Orthodontic management of missing maxillary central incisor. *Int J Orthod Rehabil* 2018;9:78-81.

deciduous maxillary canines, and left second molar and upper midline is shifted to the right side by 5 mm with overjet of 5 mm and overbite of 3 mm [Figure 1]. The orthopantomogram findings were normal other than impacted teeth in relation to 25, 28 [Figure 2]. The pretreatment cephalometric evaluation revealed a skeletal Class I relationship ($ANB = 2^\circ$) with an average mandibular plane angle ($FMA = 23^\circ$). The maxillary incisors were proclined ($UI-SN = 118^\circ$) and mandibular incisors were uprighted ($IMPA = 95^\circ$). The soft tissue profile was orthognathic.

The patient was diagnosed as Angle's Class I malocclusion with proclination and mild crowding of the maxillary anterior teeth with missing 11 and impacted 25. The treatment plan implemented was regaining space of missing right central incisor and replacement with prosthetic implant for obtaining an esthetic smile, disimpaction of left maxillary second premolar, reducing the proclination, and relieving crowding.

After the extraction of retained deciduous canines (53, 63), treatment was initiated with fixed $0.022'' \times 0.028''$ preadjusted edgewise brackets. The maxillary and mandibular arches were leveled and aligned in 4 months. Laser-assisted gingivectomy was done to expose the crown of impacted maxillary left 2nd premolar followed by disimpaction in 5 months [Figure 3]. Space of 9 mm was regained using open coil spring between right lateral and left central incisor in 8 months. Implant (Equinox Myriad plus implant $4.5 \text{ mm} \times 13 \text{ mm}$) was placed after achieving root parallelism; space was maintained using riding pontic until the implant was restored with crown. After 18 months of active treatment,

debonding was done and fixed lingual retainers were placed with a riding pontic in the maxillary arch.

The posttreatment results showed the correction of proclination, achieving Class I canine and molar relationship bilaterally, coinciding midlines. The posterior occlusion was improved by successful disimpaction of second premolar [Figure 4]. The cephalometric analysis showed no significant skeletal change; minimal dental changes were observed as entire space utilized for replacement of central incisor except some reduction in measurements ($UI-SN = 110^\circ$ and $IMPA = 93^\circ$) [Figure 5].

DISCUSSION

Missing maxillary incisors have a major impact on facial esthetics, which affects self-esteem and general social interaction.^[13] This article describes the placement of prosthetic implant in the space regained by orthodontic tooth movement.

The factors associated with anterior tooth loss include tipping of adjacent teeth, overeruption of antagonist teeth, deviation of midline to one side, masticatory impairment, speech problems, and lingual dysfunction. The conditions which are favorable for space regaining are normal intercuspation of posterior teeth with well-aligned anterior teeth, spacing in maxillary dentition, more size difference of canine and premolar. The conditions which are favorable for space closure are the maxillary crowding with balanced profile, similar size of canine and premolar, Class II malocclusion, and mild proclination of anterior teeth. The problems which

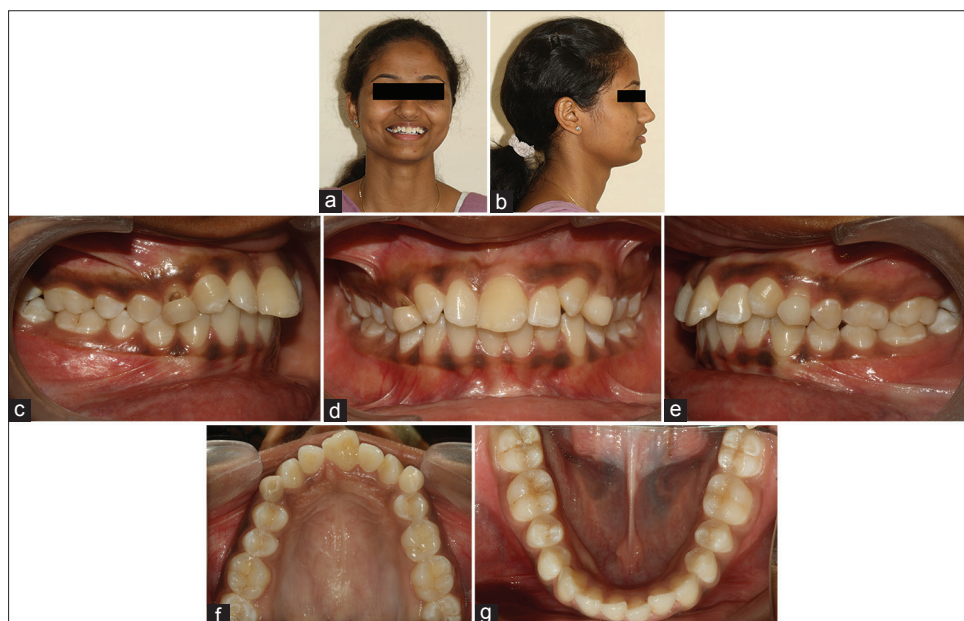


Figure 1: Pretreatment extra oral and intra oral photographs

occur when the space was closed include unaesthetic gingival margins of canine and incisor, color difference between lateral incisor and canine, crown inclination of lateral incisor and

canine, and problem with canine-guided occlusion because of palatal cusp of premolar.^[14]

The successful use of dental implants to replace missing teeth have become an esthetic treatment option.^[10] Spear was in favor of the opinion that the ideal replacement for missing teeth is an implant provided all factors are favorable. The amount of space required for the implant placement is determined and regained space with orthodontics. The ideal timing for implant placement is when the vertical growth of the patient was completed, usually 14–15 years in girls and 16–17 years in boys.^[15]

The advantage of using soft tissue laser for exposure of impacted teeth is its ability to precisely cut, coagulate, ablate or vaporize the target tissue with less trauma, easy bonding of bracket to dry enamel and eliminate suture placement.^[16] Prosthetic riding pontic is placed during and after fixed orthodontic treatment as a space maintainer to improve esthetics. The prosthetic implant (Equinox Myriad plus implant 4.5 mm × 13 mm) was placed after achieving root parallelism of adjacent teeth. Later permanent crown was loaded onto the implant. The total duration of treatment was 18 months. At the end of the treatment, ideal canine relationship, overjet and overbite were achieved. Finally, desired esthetic smile was achieved after the successful multidisciplinary approach.

CONCLUSION

Replacing the lost central incisor and regaining the lost space is a challenge to orthodontist due to its multidisciplinary

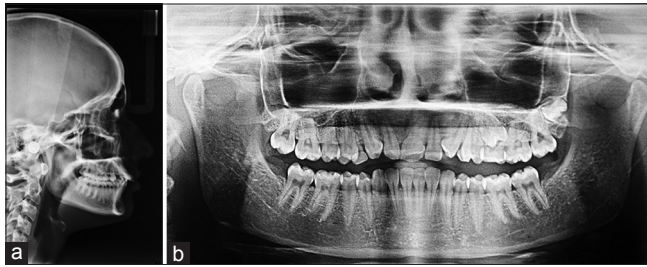


Figure 2: Pretreatment lateral cephalogram and OPG

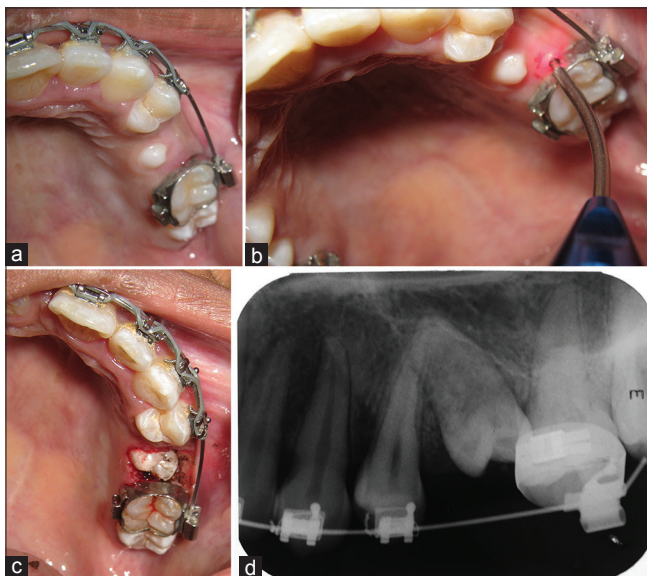


Figure 3: Laser assisted exposure of impacted maxillary left 2nd premolar

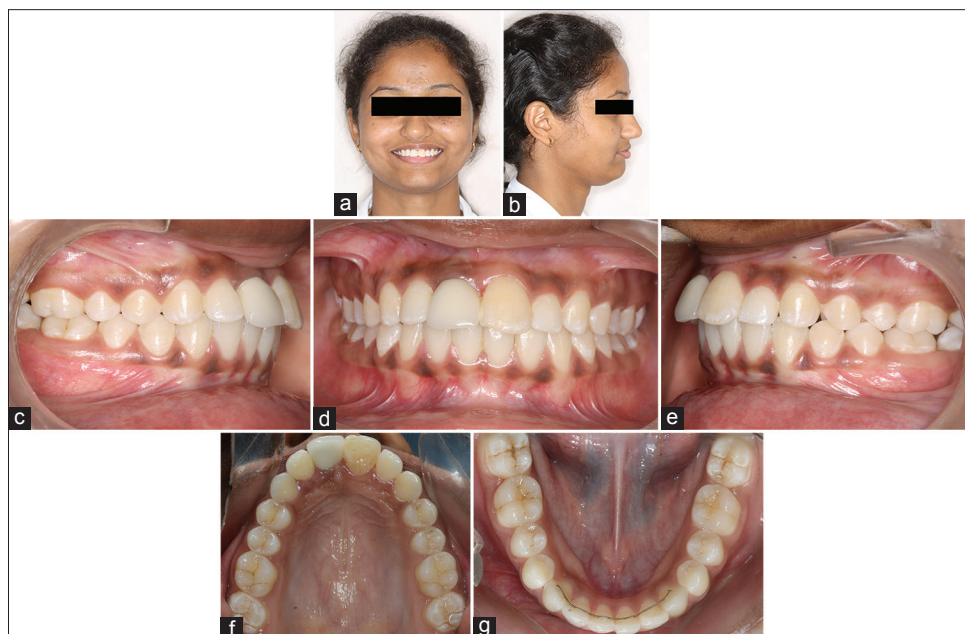


Figure 4: Post treatment extra oral and intra oral photographs



Figure 5: Post treatment lateral cephalogram and OPG

protocol which is technique sensitive. In this case report, the patient was successfully treated by orthodontic space regaining followed by prosthetic implant, thereby achieving good esthetic smile.

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. O'Mullane DM. Injured permanent incisor teeth: An epidemiological study. *J Ir Dent Assoc* 1972;18:160-73.
2. Andreasen JO, Ravn JJ. Epidemiology of traumatic dental injuries to

- primary and permanent teeth in a Danish population sample. *Int J Oral Surg* 1972;1:235-9.
3. Bauss O, Röbling J, Schweska-Polly R. Prevalence of traumatic injuries to the permanent incisors in candidates for orthodontic treatment. *Dent Traumatol* 2004;20:61-6.
4. Zachrisson BU. Planning esthetic treatment after avulsion of maxillary incisors. *J Am Dent Assoc* 2008;139:1484-90.
5. Liegeois F, Limme M. Modified bonded bridge space maintainer. *J Clin Pediatr Dent* 1999;23:281-4.
6. McIntyre JD, Lee JY, Trope M, Vann WF Jr. Management of avulsed permanent incisors: A comprehensive update. *Pediatr Dent* 2007;29:56-63.
7. Bowden DE, Patel HA. Autotransplantation of premolar teeth to replace missing maxillary central incisors. *Br J Orthod* 1990;17:21-8.
8. Kokich VG, Crabill KE. Managing the patient with missing or malformed maxillary central incisors. *Am J Orthod Dentofacial Orthop* 2006;129:S55-63.
9. Gautam R, Nene P, Mehta K, Nene S, Hegde A, Jaju R, *et al.* Treatment strategies for missing maxillary central incisor – An orthodontist's perspective. *J Prosthodont* 2014;23:509-13.
10. Huang S, Kang T, Duan Y. Traumatic loss of a maxillary central incisor treated with nonextraction orthodontics. *Am J Orthod Dentofacial Orthop* 2013;143:246-53.
11. Czochrowska EM, Skaare AB, Stenvik A, Zachrisson BU. Outcome of orthodontic space closure with a missing maxillary central incisor. *Am J Orthod Dentofacial Orthop* 2003;123:597-603.
12. Savana K, Ansari A, Hamsa PR, Kumar M, Jain A, Singh A, *et al.* Interdisciplinary therapy in orthodontics: An overview. *Int J Adv Health Sci* 2014;1:23-31.
13. Kokich VG, Nappen DL, Shapiro PA. Gingival contour and clinical crown length: Their effect on the esthetic appearance of maxillary anterior teeth. *Am J Orthod* 1984;86:89-94.
14. Newsome P, Owen S, Reaney D. Clinical quandaries: Strategies for dealing with space closure following the loss of a central incisor. *Int Dent SA* 2011;13:6-10.
15. Parayaruthottam P, Antony V. Replacement of missing maxillary central incisor with an osseointegrated implant-supported prosthesis from an orthodontic perspective: A multidisciplinary approach. *Int J Oral Implantol Clin Res* 2015;6:58-63.
16. Kedia NB, Yadav SK, Yadav AB. Soft tissue lasers in orthodontics: An overview. *Int J Dent Health Sci* 2014;1:179-86.