ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 4, Issue – 2, March - 2021, Page No. : 346 - 351

Management of multiple impacted teeth with guided eruption: A Case Report

[1]Dr Paridhi Gupta, 3rd year Post graduate student Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental college and hospital, JSS AHER, Mysuru -570015, Karnataka, India

[2]Dr Nithin V. Joy, Post graduate student Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental College and hospital, JSS AHER, Mysuru -570015, Karnataka, India

[3]Dr Jyothi Kiran H , Associate Professor Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental college and hospital, JSS AHER, Mysuru -570015, Karnataka, India

[4]Dr Bhagyalakshmi A., MDS, Ph.D Reader Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental college and hospital, JSS AHER, Mysuru -570015, Karnataka, India

[5]Dr Munaif V., Post graduate student Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental college and hospital, JSS AHER, Mysuru -570015, Karnataka, India

Corresponding Author: Dr Paridhi Gupta, 3rd year Post graduate student Department of Orthodontics and Dentofacial Orthopaedics, JSS Dental college and hospital, JSS AHER, Mysuru -570015, Karnataka, India

Citation of this Article: Dr Paridhi Gupta, Dr Nithin V. Joy, Dr Jyothi Kiran H , Dr Bhagyalakshmi A., Dr Munaif V., "Management of multiple impacted teeth with guided eruption: A Case Report", IJDSIR- March - 2021, Vol. – 4, Issue - 2, P. No. 346 – 351.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

The development of the tooth and its eruption in due course of time is the basic attribute of establishing a proper and functionally stable occlusion. Treatment of a multiple impacted case requires an interdisciplinary approach in order to achieve the desired objectives. The following case report illustrates a patient reportedly diagnosed with multiple impacted with no underlying syndrome or medical condition. Diagnosis, treatment planning and various modalities used have been de-scribed in this case report. Orthodontic treatment with surgical exposure and liga-tion of multiple permanent teeth helped us to achieve a significantly improved functional and esthetic result.

Keywords: Multiple impaction, guided eruption, diagnosis and treatment planning.

Introduction

The development of the tooth and its eruption in due course of time is the basic attribute of establishing a proper and functionally stable occlusion. Lack of eruption of a tooth must be speculated for its causes and resolved as soon as possible. An impacted tooth as defined by Graber is "a permanent tooth whose root is developed in

excess of its length and whose spontaneous eruption is not expected in a reasonable amount of time".

Etiology

The etiology of an impacted tooth is multifactorial. 2 It may be genetic eg. cleft palate patients or due to local causes such as space-arch length discrepancy, dis-placement of primary tooth bud, presence of cyst, supernumerary tooth etc.3,4

Incidence and prevalence: Most commonly impacted teeth are the lower third molars followed by upper third molars, upper canines, upper and lower premolars, upper incisors, lower ca-nines, lower incisors, upper and lower first molars and upper and lower second molars.5,6 Maxillary incisors are involved in 0.06% to 0.2% of impactions.7 The prevalence of maxillary canine impaction is 0.9-2.2% with an incidence of 0.8-2.8%. Studies have shown increased female predilection than males.8,9 Presence of multiple im-pacted teeth is rare and usually associated with systemic conditions.10

History and Diagnosis: A 19-year old male patient came to the department of orthodontics and dentofa-cial orthopaedics at JSS Dental college and hospital, Mysuru with a chief com-plaint of missing upper front teeth. Patient reported no relevant medical history with no known allergies and no history of trauma. His general physical status was normal. Extra-Oral examination Patient was found to be mesocephalic, mesoproscopic with straight profile and competent lips (Fig.1).

Intra-Oral examination

He had Class I molar relation bilaterally with overjet and overbite of 2mm. he had missing 11,12,13 and 23 with retained 63. Maxillary arch was U-shaped with ro-tated 14, crossbite w.r.t 15 and 45.Mandibular arch was grossly symmetrical with mild imbrication in lower anterior region (Fig.2).

Radiographs

Panoramic radiograph revealed impacted 11,12,13 and 23 (Fig.3). CBCT imaging was done for correct diagnosis and treatment planning.11 was found to be lying horizontally crossing the midline.12 was place high up in the alveolus in between the roots of 14 and 15. 13 was placed palatally between 14 and 15. (Fig.4) According to Erickson and Kurol analysis 23 was placed in sector I. Warford analysis showed 23 at an angle of 60 degree to the bi-condylar axis.

Cephalometrics

Cephalometric analysis revealed backwardly placed maxilla and mandible with mildly proclined upper and lower anteriors. Patient was diagnosed as Angle's class I malocclusion with multiple impacted teeth with retrognathic maxilla and mandible on skeletal class I jaw bases with a horizontal growth pattern (Fig 5).

Treatment objectives

The main goal of the treatment was disimpaction with guided eruption of the teeth to obtain an esthetic and functionally stable occlusion.To maintain the ideal over-jet and overbite and the class I molar relation.

Treatment

The treatment plan decided was extraction of 12 and 63 followed by PEA mechanotherapy using MBT 0.022 slot with variable prescription and standard torque was used along with disimpaction of 11,13 and 23. Due to poor prognosis of 12 as it was highly placed in the alveolus it was decided to extract it followed by prosthetic rehabilitation post orthodontic therapy. Treatment progress Patient underwent extraction of 12 and 63 prior to start of orthodontic treatment. One week post extraction 0.022 x 0.028 inch slot preadjusted appliance was bonded to the available teeth and light continuous force with 0.014 HANT wire was applied (Fig.6). TPA was placed in the upper arch. Treatment was continued with 0.016

HANT,0.018 AJ wilcock, 17 x 25 HANT AND 19 X 25 HANT.

Disimpaction was done on 19 x 25 SS. Surgical exposure of the impacted teeth was done using closed eruption technique (Fig.7). Beggs bracket were used to ap-ply traction forces using. Teeth 11 and 23 were exposed, and attachments were bonded on the labial aspect of the exposed teeth and the full thickness mucoperio steal flap was sutured back. Ligature chains were placed on these attachments for application of tractional forces. Extrusive forces of 120 g were initially applied to 11 and 23 by using active ligature ties directly onto the Begg bracket. The force was measured using a Dontrix gauge. After vertical force traction was then applied to mesialize 11 by using Guerin lock in the midline of upper arch and extending an E-chain from the stop to the bonded attachment on 11(Fig.8A). Post mesialization of 11, surgical exposure of 13 was done by closed eruption technique in the same manner as described for 11 and 23. Treatment was continued on 19 x 25 SS with piggly back 0.016 HANT wire (Fig.8B). Derotation of premolar was carried out on 19 X 25 SS wire using a couple (Fig.9A and B). Space was then created between 11 and 13 using an open coil spring for prosthetic rehabilitation of 12 (Fig.9C). Rotations were corrected and space was maintained for lateral incisor replacement.(Fig.10)

Discussion

Multiple impactions are and can be associated with various syndromes like Gardner syndrome, Down syndrome, Cleidocranial dysplasia.11 In this patient apart from multiple impactions no other anomaly or syndrome was diagnosed. Multiple impactions are associated with lack of self-esteem and psychological issues associated with esthetic and functional problems depending on the number of teeth affected. Hence, to achieve an esthetic and functionally stable occlusion a multidisciplinary approach is required with close cooperation of the orthodontist, the oral surgeon, and the Periodontist and Prosthodontist. Extraction of an ectopically placed tooth is not acceptable unless it is ankylosed and cannot be transplanted, shows signs of severe root resorption, cystic changes or any other pathology.12,13Risks involved during disimpassion of multiple teeth should be explained to the patient prior to start of the treatment.14 Various surgical modalities to manage an impacted tooth are closed eruption,15,16 open eruption,13 gingivectomy,8apically repositioned flap,8and tunnel traction.17In this case closed eruption technique was preferred to ensure adequate width of attached gingiva, prevent gingival recession and good gingival contour and keeping in mind the long term prognosis.18,19 Many techniques are available for applying the force to the attachment in order to dis impact the tooth such as:

1. Ballista spring15 which is constructed using round 0.016 or 0.018 SS wire but causes buccal crown torque on molar, hence increased anchorage constraints.
2. Kilroy spring20 which are of 2 types I and II depending o the direction of trac-tion.
3. Cantilever system21 constructed using 17 x 25 TMA wire used for unilateral or bilateral canine impactions.
4. 4 K-9 spring22 constructed using 17 x 25 TMA wire consists of horizontal and vertical arm place at 90 degree for engagement to the attachment.

All the above mentioned procedure couldn't be used for this case due to presence of multiple impactions. Piggy back arch wire technique was used in this case as it consisted of a rigid archwire as the base wire piggybacked by a flexible NiTi wire which was simple and easy to use and could be easily ligated to the attachment without involving multiple loops or wires especially as the patient had multiple impacted teeth. Temporary anchorage

devices23 can also be used in critical anchorage situations and to provide the correct biomechanics but in this case multiple TADs would have to be repositioned increasing labor time and patient trauma.

Conclusion

Treatment of multiple impacted teeth is a challenge for an orthodontist. Proper diagnosis and treatment planning should be done to rule out any syndromes, to minimize the side-effects and to achieve a stable functional and esthetic occlusion. Careful monitoring and a multidisciplinary approach in this case led to a successful esthetic result, with a healthy Periodontium.

References

1. Thomas M. Graber, Robert L. Vanarsdall, and Katherine W.L. Vig: Orthodon-tics: Current principles technique. Fourth edition. Elsevier Mosby: 2005.
2. Kokich, V.G. and Mathews, D.P.: Sur- gical and orthodontic management of impacted teeth, Dent. Clin. N. Am. 37:181-204, 1993.
3. Ibricevic, H.; Al-Mesad, S.; Musta- grudic, D.; and Al-Zohejry, N.: Super- numerary teeth causing impaction of permanent maxillary incisors, J. Clin. Pediat. Dent. 27:327-332, 2003.
4. Batra, P.; Duggal, R.; Kharbanda, O.P.; and Parkash, H.: Orthodontic treat-ment of impacted anterior teeth due to odon- tomas: A report of two cases, J. Clin. Pediat. Dent. 28:289-294, 2004.
5. Pinho T, Neves M, Alves C. Impacted maxillary central incisor: Surgical ex-posure and orthodontic treatment. Am J Orthod Dentofacial Orthop 2011;140:256-65.
6. Jacoby H. The etiology of maxillary canine impactions. Am J Orthod 1983;84:125-32.
7. Manne R, Gandikota C, Juvvadi SR, Rama HR, Anche S. Impacted canines: Etiology, diagnosis, and orthodontic management. J Pharm Bioallied Sci 2012;4:S234-8.
8. Pankaj A, Akshay D. Management of impacted teeth in orthodontic practice. J Clin Diagn Res 2011;5:894-8.
9. Grover, P.S. and Lorton, L.: The inci- dence of unerupted permanent teeth and related clinical cases, Oral Surg. Oral Med. Oral Pathol. 59:420-425, 1985.
10. Treatment of a patient with multiple impacted teeth.Conley RS, Boyd SB, Legan HL, Jernigan CC, Starling C, Potts C.Angle Orthod. 2007 Jul; 77(4):735-41.
11. Yalcin, S. and Gurbuzer, B.: Multiple impacted teeth in the maxilla, Oral Surg. Oral Med. Oral Pathol. 76:130, 1993.
12. Bedoya MM, Park JH. A review of the diagnosis and management of impact-ed maxillary canines. J Am Dent Assoc 2009;140:1485-93.
13. Bishara SE. Impacted maxillary canines: A review. Am J Orthod Dentofacial Orthop 1992;101:159-71.
14. Kolokitha, O.E. and Papadopoulou, A.K.: Impaction and apical root angula- tion of the maxillary central incisors due to supernumerary teeth: Combined surgical and orthodontic treatment, Am. J. Orthod. 134:153-160, 2008.
15. Jacoby H. The 'ballista spring" system for impacted teeth. Am J Orthod 1979;75:143-51.
16. Becker, A.; Brin, I.; Ben-Bassat, Y.; Zilberman, Y.; and Chaushu, S.: Closed-eruption surgical technique for impacted maxillary incisors: A post- orthodon-tic periodontal evaluation, Am. J. Orthod. 122:9-14, 2002.
17. Crescini A, Clauser C, Giorgetti R, Cortellini P, Pini Prato GP. Tunnel traction of infraosseous impacted maxillary canines. A three-year periodontal follow-up. Am J Orthod Dentofacial Orthop 1994;105:61-72.

18. Brand, A.; Akhavan, M.; Tong, H.; Kook, Y.A.; and Zernik, J.H.: Ortho- don-tic, genetic, and periodontal consid- erations in the treatment of impacted maxillary central incisors: A study of twins, Am. J. Orthod. 117:68-74, 2000.
19. Vanarsdall, R.L. and Corn, H.: Soft- tissue management of labially posi- tioned unerupted teeth, Am. J. Orthod. 72:53-64, 1977.
20. S.J. Bowman, Aldo Carano. Kilroy spring for impacted teeth, JCO. 2003
21. Fischer TJ, Ziegler F, Lundberg C. Cantilever mechanics for treatment of im-pacted canines. J Clin Orthod 2000;34(11):647-50.
22. Kalra V. The K-9 spring for alignment of impacted canines. J Clin Orthod 2000;34(10):606-10.
23. Park HS, Kwon OW, Sung JH. Micro-implant anchorage for forced eruption of impacted canines. J Clin Orthod 2004;38(5):297-302.

Legend Figure

Fig.1: Extra-Oral Photographs

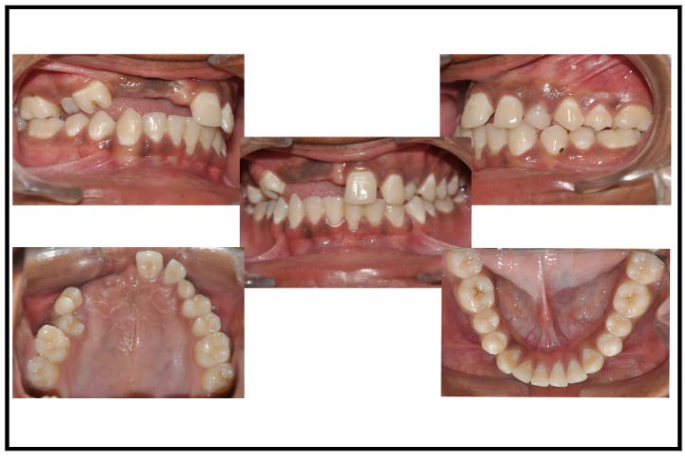

Fig.2: Intra-Oral Photographs

Fig.3: Orthopantomogram

Fig.4: Cone beam computed tomography (CBCT)

Fig. 5 : Lateral Cephalogram

Fig. 6 : InItial alignment and leveling using 0.014 HANT

Fig. 7 : Exposure of impacted tooth using closed eruption technique

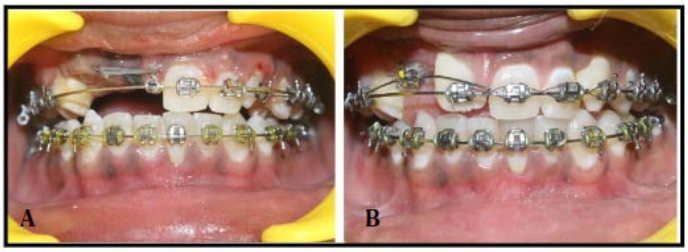

Fig. 8 : A. Mesialization of 11 on 19 x 25 SS using guerin lock. B. Piggy back technique on 19 x 25 SS wire.

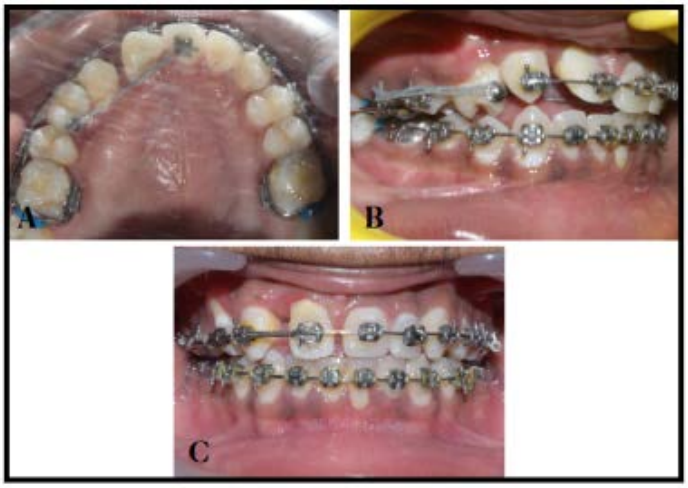

Fig. 9 : A and B depicting derotation of premolar using a couple. C. Open coil spring to create space for prosthetic rehabilitation of lateral incisors

Fig. 10 : A and B showing frontal and occlusal view before prosthetic rehabilita-tion of lateral incisor.