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Orthodontic consideration and management of bilateral palatally impacted maxillary canine using multipurpose arch wire.

[1]Lobsang Chhodon, Senior Resident, Department of Plastic and Reconstructive Surgery, K.G.M.U, Lucknow, Uttar Pradesh.

[2]Gyan P. Singh, Professor, Department of Orthodontics and Dentofacial Orthopaedics, F.O.D.S, K.G.M.U, Lucknow, Uttar Pradesh.

[3]Pradeep Tandon, Professor, Department of Orthodontics and Dentofacial Orthopaedics, F.O.D.S, K.G.M.U, Lucknow, Uttar Pradesh.

[4]G.K. Singh, Professor and Head, Department of Orthodontics and Dentofacial Orthopaedics, F.O.D.S, K.G.M.U, Lucknow, Uttar Pradesh.

[5]Priyanka N.P., Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, Rajas Dental College and Hospital, Kaval kinaru, Tirunelveli, Tamil Nadu.

[6]Chaudhary Rohit Gopal, Senior Resident, Lala Lajpat Rai Memorial Medical College, Meerut, Uttar Pradesh.

Corresponding Author: Lobsang Chhodon, Senior Resident, Department of Plastic and Reconstructive Surgery, K.G.M.U, Lucknow, Uttar Pradesh.

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Abstract

Maxillary canines are distinctive components of dental arches. An impaction-related failure of canine eruption will have an impact on the occlusion and aesthetics.

There are currently a variety of management recommend dations for impacted maxillary canines. This case report presents the surgical and ortho dontic management of a patient with bilateral palatally impacted permanent maxi llary canines. Following surgical exposure, the canine was repositioned through ortho dontic traction with the help of a K-9 spring and multipurpose arch wire, leading to appropriate functioning, great aesthetics, and good Perio dontal health.

Keywords: impacted maxillary canines; palatal im paction; multi-purpose arch wire; K-9 spring

Introduction

A tooth that has lost its ability to erupt into its ap propriate position fully or partially in the dental arch is said to be impacted. The maxillary canine is 50 times more likely to become impacted than the mandibular

canines, making it the second most frequently impacted tooth after third molars[1].

The prevalence of impacted maxillary canines ranges bet ween 0.9 and 2.2%[2]. Females are more likely than men to experience maxillary canine impaction, with palatal impaction occurring at a rate of around 85% and labial impaction at a rate of 15% [3–5]. In contrast, just 28% of Asian participants had palatal displacement, whereas 72% of them had labial displacement[6]. Lack of arch space and palatally impacted canine do not significantly correlate. In general, palatal dis placement happens in dependently of dental arch space[7].

The distinctive components of dental arches are canines as they play a crucial role in supporting the lips and enhancing face aesthetics.

Impacted canines have been managed with surgical exposure and ortho dontics to bring them into occlusion. The following case report describes the combined surgical and ortho dontic correction of bilaterally impacted maxillary permanent canines through the close eruption technique.

Diagnosis

A 19-year-old female patient reported to the Ortho dontics and Dentofacial Orthopaedics OPD with the chief complaint of missing upper teeth on the right side. The patient had no family history. An intraoral exam ination revealed end-on-molar relationships on both sides, clinically missing bilateral maxillary permanent canines, and retained deciduous right canine (Figure 1). CBCT and OPG showed bilaterally impacted permanent upper canines in Sector IV[8], angled at 77° and 58° to the midline[9] and palatally placed suggesting a great treat ment challenge (Figure 2).

Figure 1: Extraoral and Intraoral pre-treatment photo graphs

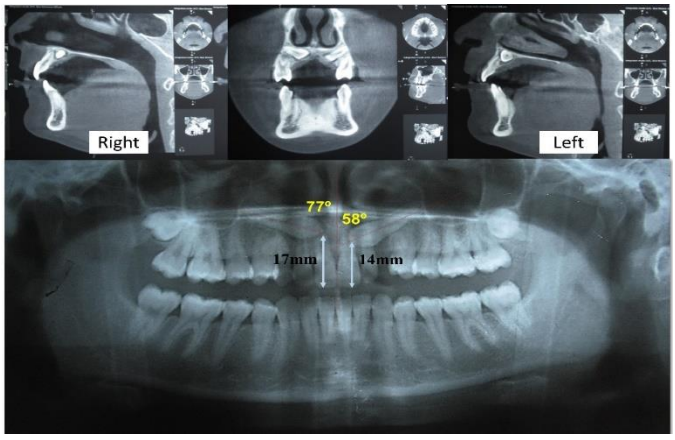

Figure 2: Pre-treatment CBCT and OPG showing bi late rally impacted permanent upper canines in Sector IV, angled at 77° and 58° to the midline at a distance of 17 mm and 14mm from occlusal plane

Treatment Objective

The first molars were banded as part of the treatment plan, the transpalatal arch was attached, and the remain ning teeth were bonded using a 0.022 x 0.028" pre -ad justed edge-wise appliance. Following that, the decidu ous canine was extracted, and permanent canines were surgically exposed for forced ortho dontic eruption through the closed eruption technique.

Multipurpose arch wire

Fabricated with 0.019 x 0.025” TMA wire (Figure 3). It comprises a helix, two open vertical loops, and a v bend on either side. In order to gain space, a double vertical loop may be opened and a helix for attaching power chains and V bend for a counter clockwise moment of the first premolar.

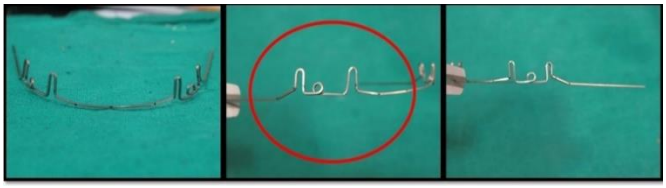

Figure 3: Multipurpose arch wire

Treatment Progress

Sequential NiTi wires were used for levelling and align ment, subsequently, 0.016x0.022" and 0.017x0.025" SS were used. Impacted canines 23 and 13 were surgically exposed, followed by the bonding of an attachment to the impacted canines and a ligature wire was tied to the attachment to provide the canines traction. The flap was then sutured back in place. For the vertical eruption of impacted canines, a K-9 spring fabricated of 0.017 x0.025 TMA wire was installed and ligated to the attachment (Figure 4).

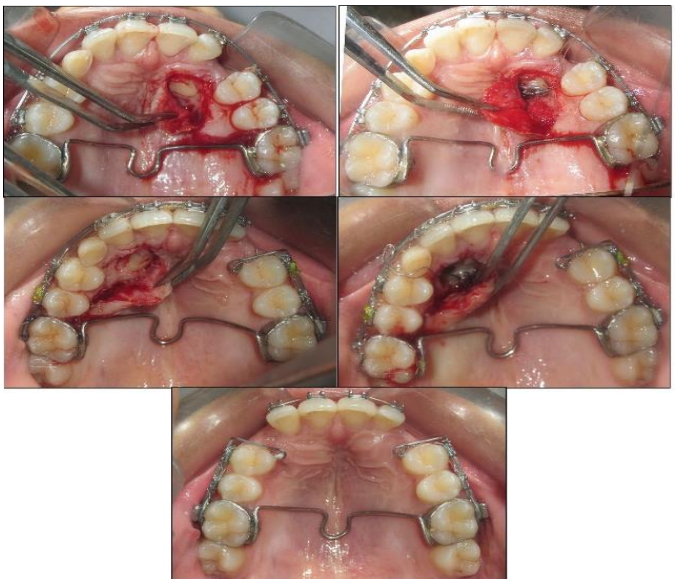

Figure 4: Surgical exposure of maxillary canines and insta llation of K9 spring

Buccal traction force was applied by a power chain attached to the helix of multipurpose wire as the teeth moved vertically. To eliminate root interference during canine buccal traction, a double vertical loop is activated by opening the loop to provide space and a v bend distal to the second loop for distal movement of roots of the adjacent teeth (Figure 5). Following buccal traction, a bracket was bonded and an auxiliary 0.016" NiTi was ligated, and gradually raised to 0.019 0.025" SS before finishing and detailing were completed.

Figure 5: Buccal traction of canine with power chain and control of adjacent teeth and space management with Multi-purpose arch wire

Treatment result

The entire course of treatment was completed in 16 months. The two impacted maxillary canines were correctly aligned at the end of the treatment (Figure 6). According to the treatment goals, the full interdigitation was effectively completed with bilateral full Class I molar relation and Class I canine relation along with satisfactory root parallelism as seen in the panoramic film (Figure 7). Despite being a long course of canine, the treatment had no negative effects on the roots or the periodontium and significantly enhanced the aesthetics of the face and smile. For retention, removable Hawleys retainers in both jaws were given immediately after removing all the fixed orthodontic appliances.

Figure 6: Extraoral and intraoral post-treatment photo graphs

Figure 7: Post treatment OPG

Discussion

The majority of canine impactions deviate from the normal eruptive position in either the palatal or buccal directions. Inadequate arch space is typically the cause of buccal/facial impaction, whereas palatal displacement is a positional ab normality that typically occurs despite enough arch space[7].

Ankylosis, root resorption of canines and lateral incisors, and infections brought on by impaction can all be minimized with early diagnosis[4]. Since canines play a significant Esthetic and functional role, orthodontic traction in permanent dentition aims to place the canines in the dental arch without causing periodontal damage[10].

One of the prognostic features for determining the treatment's difficulties and the prognosis is said to be the inclination of the impacted canine. In the present case, OPG showed a bilaterally impacted permanent upper canines in Sector IV, with an angulation of 77° and 58° to the midline, indicating a very challenging treatment [11,12].

To overcome this challenge, it is crucial to look at the spatial relationships between the impacted canine and its surroundings. The period ontal tissues were preserved in this case by using the closed eruption approach stimu lating the natural eruption of the impacted tooth. A combination of multi-functional arch wire and light eruption force through the K 9 spring helped to get the bilaterally palatally impacted canines into the arch. It is important to watch out for periodontal attachment while the tooth is positioned into the arch.

Conclusion

Treatment of bilateral maxillary canine impactions is a challenging one. However, the right surgical technique is necessary for these teeth to be managed properly to apply forces in a positive direction preventing damage to the neighbouring teeth. Utilizing a multifunctional arch wire and K 9 spring to traction an impacted canine reduces adverse effects and hence enhances periodontal health.

References

1. Korn Hauser S, Abed Y, Harari D, Becker A. The resolution of palatally impacted canines using palatal-occlusal force from a buccal auxiliary. Am J Orthod Den to facial Orthop. 1996 Nov; 110 (5): 528-34. doi: 10. 1016/ s0889-5406 (96) 70061-6. PMID: 8922512.

2. Rohrer A. Displaced and impacted canines A radio graphic research. Int J Orthod Oral Surg. 1929; 15:1003-1020. https://doi.org/10.1016/S0099-6963(29)90386-0.

3. Bishara SE. Impacted maxillary canines: a review. Am J Orthod Dento facial Orthop. 1992 Feb;101(2):159-71. doi: 10.1016/ 0889 - 5406 (92) 70008-X. PMID: 173 9070.

4. Ngan P, Horn brook R, Weaver B. Early timely management of ectopically erupting maxillary canines. Semin Orthod. 2005; 11:152-63. https:// doi.org/ 10. 10 53/ j. sodo.2005.04.009.

5. Zuccati G, Ghobadlu J, Nieri M, Clauser C. Factors associated with the duration of forced eruption of im pacted maxillary canines: a retro spective study. Am J Orthod Dentofacial Orthop. 2006 Sep;130(3):349-56. doi: 10.1016/j.ajodo.2004.12.028. PMID: 16979493.

6. Oliver RG, Mannion JE, Robinson JM. Morphology of the maxillary lateral incisor in cases of unilateral impaction of the maxillary canine. Br J Orthod. 1989 Feb; 16 (1):9-16. doi: 10.1179 /bjo.16.1.9. PMID: 2 92 38 51.

7. Peck S, Peck L, Kataja M. The palatally displaced canine as a dental anomaly of genetic origin. Angle Orthod. 1994; 64 (4): 249-56. doi: 10.1043/ 0003-3219 (1994) 064 <0249: WNID>2.0.CO;2. PMID: 7978519.

8. Lindauer SJ, Rubenstein LK, Hang WM, Andersen WC, Isaacson RJ. Canine impaction identified early with panoramic radiographs. J Am Dent Assoc. 1992 Mar; 123 (3):91-2, 95-7. doi: 10.14219/ Jada. archive. 1992. 0069. Erratum in: J Am Dent Assoc 1992 May; 123 (5): 16. PMID: 1545064.

9. Ericson S, Kurol J. Early treatment of palatally erupting maxillary canines by extraction of the primary canines. Eur J Orthod. 1988 Nov;10(4):283-95. doi: 10. 1093/ ejo/10.4.283. PMID: 3208843.

10. Mesotten K, Naert I, van Steenberg he D, Willems G. Bilaterally impacted maxillary canines and multiple missing teeth: a challenging adult case. Orthod Cranio fac Res. 2005 Feb; 8 (1):29-40. doi: 10.1111/j.1601-6343. 20 04. 00313.x. PMID: 15667643.

11. Motamedi MH, Tabatabaie FA, Navi F, Shafeie HA, Fard BK, Hayati Z. Assessment of radiographic factors affecting surgical exposure and orthodontic alignment of impacted canines of the palate: a 15-year retrospective study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009 Jun;107(6):772-5. doi: 10.1016 /j. tripleo. 2008. 12.022. Epub 2009 Feb 8. PMID: 19201625.

12. Sajnani AK, King NM. Early prediction of max illary canine impaction from panoramic radiographs. Am J Orthod Dentofacial Orthop. 2012 Jul;142(1):45-51. doi: 10.1016/ j. ajodo.2012.02.021. PMID: 22748989.