

Case Report

Ortho-surgical Management of Palatally Impacted Canine – A Case Report

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Abstract: Maxillary canines are essential for function and esthetics. Patients with impacted maxillary canine are considered to be more difficult to treat than the average orthodontic patients because successful treatment requires proper surgical technique and orthodontic mechanisms. This case report describes the treatment of a 21-year-old male with a palatally impacted maxillary canine on left side and highly placed canine on right side and crowded lower anteriors. Using open window exposure with placement of an attachment, following by distal orthodontic force to bring the canine crown away from the root of lateral incisor, then buccal traction to guide canine into normal occlusion. We obtained favorable esthetics and stable occlusion.

Keywords: palatally impacted canine, orthodontic traction, surgical exposure

INTRODUCTION:

Maxillary canine are essential for the functional occlusion and esthetic smile. However, the maxillary canine is second to the third molar in the frequency of impaction with an incidence of about 2% [1]. Previous studies have showed that 50% to 85% of impacted canines were palatally displaced [2, 3]. The impacted maxillary canine is often not noticed by the patient until the rest of the permanent dentition has fully erupted, or somehow diagnosed by the general dentist through routine X-ray examination. Combined surgical exposure and orthodontic traction is the common approach for management of palatally impacted canines. Several studies have suggested that the initial vertical and horizontal position of palatally impacted canines may affect the treatment success and post treatment periodontal status [4].

This case report describes the treatment procedures and results of a 21-year-old male with a palatally impacted maxillary canine on left side and highly placed canine on right side and crowded lower anteriors. Through the cooperation of maxillofacial surgeon and orthodontist, we achieved an esthetic and functional outcome.

CASE REPORT:

A 21-year old male patient came to orthodontic consultation with chief complaint of missing canine on his upper left side and irregularly arranged upper and lower front region teeth. After review of past medical history, no drug allergies or medical problem was

found. There was also no history of trauma to the teeth and no sign and symptom of TMD.

Clinical Findings:

1. Extra oral: (Fig 1)
 - I. Frontal view: Facial symmetry
 - II. Smile view: no gummy smile or lip incompetence
 - III. Lateral view: convex profile with obtuse nasolabial angle
2. Intraoral: (Fig 2)
 - I. Frontal view: over jet 1 mm, overbite 2 mm, lower dental midline deviation to the left 4 mm when Compare to facial midline
 - II. Upper occlusal view: tapered arch form with 8 mm space decency, tooth #22 rotated and tooth #13 Labially placed.
 - III. Lower occlusal view: tapered arch form with 9 mm space deficiency, teeth #34, 42, 44 rotated and tooth #32 lingually placed.
 - IV. #32 lingually placed.
 - V. Buccal view: angel's Class I molar relationship on both side.

X-ray Findings:

- I. Panoramic X-ray findings: (Fig 3)
 - I. #23 impacted with crown tip mesial to the root of lateral incisor.
- II. Cephalometric findings: (Fig 4)

- I. SNA, SNB, ANB and mandibular plane angle were within the normal range.
- II. U1- SN and L1-MP suggested proclined upper and lower incisors

Diagnosis:

A 21 year old post pubertal male patient having angel's class I malocclusion with palatally impacted tooth #23, highly placed tooth #13, lingually placed tooth #32 and rotation in relation to #22,34,42,44,On skeletal class I with ortho-divergent.

Treatment plan:

- i. The patient was offered a treatment plan involving extraction of teeth #14, 24, 34, 44. But starting of treatment decided to extract the teeth #14, 34, 44 and tooth #24 work as a space maintainer till orthodontic traction of impacted tooth #23
- ii. fixed appliance for alignment of upper and lower teeth

- iii. Surgical exposure of tooth #23 and extraction of #24 during orthodontic traction

Treatment progress:

- Extraction of teeth #14, 34, 44
- Leveling and alignment of teeth in the upper and lower dental arch by means of fixed orthodontic appliance MBT bracket0.022 “. slot
- Surgical exposure of impacted canine #23, bonding attachment on tooth #23(fig 6), extraction of tooth #24,
- Orthodontic traction of tooth #23 with E-chain force(fig 7)
- Final finishing and detailing with Correct canine relationship(fig 8)

Treatment results:

- Achieved Palatally impacted canine #23 into proper occlusal by orthodontic traction
- Achieved angle's class I molar and canine relationship

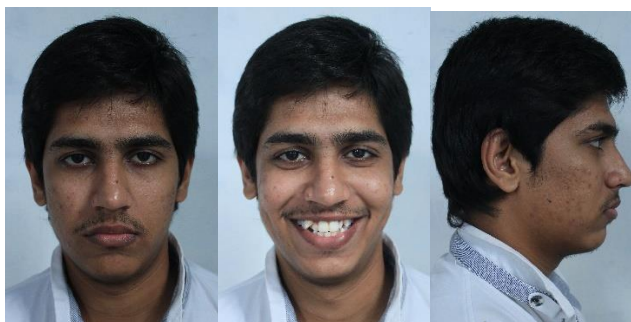


Fig 1: Pre-treatment facial photographs



Fig 2: Pre-treatment intraoral photographs



Fig 3: Pre-treatment panoramic X-ray



Fig 4: Pre-treatment lateral cephalometric X-ray



Fig 6: Surgical exposure and bonding attachment



Fig 7: Orthodontic traction



Fig 8: Intraoral photographs of finishing stage

DISCUSSION:

The etiology of impacted canine could be local factors, including prolonged retention of the deciduous canine, disturbances in tooth eruption sequence, abnormal position of tooth buds, dilacerations of the root, maxillary width deficiency [5]. Alveolar cleft and localized pathological lesions such as dentigerous cysts or odontomas. Moreover, general factors, such as

endocrine disturbance, vitamin D deficiency and genetic factors may also play a role in canine impaction [6].

Patients with impacted canine have 2.4 times higher incidence of agenesis of lateral incisors, small or peg-shaped lateral incisors. Woloshyn *et al.*; found that high percentage of root resorption or root shortening of the adjacent lateral incisor and premolar on the

impacted site [8]. In our case, we also found the roots of adjacent lateral incisor and premolar was slightly shorter than those of contralateral teeth.

There are three diagnostic methods for impacted canine: inspection, palpation, and radiography [9]. Orthodontist could early detect the impacted canine by observation of adjacent lateral incisor and premolar. Abnormal labial or palatal inclination of lateral incisor could result from the impacted canine displaced on the labial or palatal aspect of lateral incisor root. Clinical palpation of the canine bulge is also a useful method to localize the impacted canine. Several radiographic techniques have been used to assess the position of impacted canine; they are two-dimensional techniques: periapical film, SLOB technique, occlusal film, panoramic and lateral cephalometric radiographs; or three-dimensional technique: cone-beam computed tomography. Three dimensional image can accurately locate the position of the impacted canine and provide the information about the proximity between the crown of impacted canine and the root of adjacent lateral incisor or premolar [10].

Bedoya M *et al.*; suggest various surgical techniques for exposing palatally impacted canines exist: 1. technique of open eruption; 2. technique of closed eruption; 3. open eruption through a window; 4. tunnel extrusion, etc¹³. Two common methods of surgical exposure for palatally impacted canine: open exposure with free eruption and open or closed exposure with bonding attachment. Zasciurinskiene *et al.*; evaluated the impact of close eruption technique on the post treatment periodontal health of the palatally impacted canine, and indicated that combined close-eruption technique and orthodontic traction produced clinically acceptable periodontal condition [4].

This result agrees with the findings by Crescini *et al.*; [11]. However, Kokich *et al.*; compared closed exposure and open exposure technique and suggested that open exposure with free eruption had better overall results [8]. According to Ericson *et al.*; if the impacted canine crown is mesial to the midline of the lateral incisor root, there is only 64 percent of success rate for canine to normalize the erupting path after extraction of primary canine [12].

In our case, considering the initial high vertical position of the impacted canine and the crown of impacted canine are mesial to the root of lateral incisor, the percentage of failure to erupt may increase and the total treatment time may be extended. Thus, we selected open exposure technique with orthodontic traction. After treatment, the difference in the heights of gingival margin and gingival contour between the impacted canine and contralateral tooth were clinically not significantly (fig 8)

CONCLUSION

With proper clinical and radiographic diagnosis, careful selection of surgical technique and orthodontic mechanism, the treatment of palatally impacted canine can be an esthetic and functional result.

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