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# Surgical Management of Buccal and Palatal Impacted Canines: A Two-Case Report

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**ABSTRACT**

Maxillary canine impaction is a common dental anomaly that affects esthetics, occlusion, and periodontal health. Palatal impactions are more frequent than buccal ones, with a 2:1 female predilection. If left untreated, impacted canines may cause root resorption, cyst formation, and malocclusion. Early diagnosis and intervention are essential for optimal outcomes.

This report presents two cases: a palatally impacted canine and a labially impacted canine, managed using an open window technique, allowing direct visualization and orthodontic guidance. Both procedures were performed under local anesthesia, with orthodontic brackets and traction chains bonded to guide eruption.

Postoperative healing was uneventful, with no signs of infection or root resorption. Surgical exposure combined with orthodontic traction is an effective treatment approach, ensuring functional and esthetic outcomes when managed through a multidisciplinary strategy.

***Keywords:*** *Impacted Canines, Surgical Exposure, Buccal Impaction, Palatal Impaction, Orthodontic Traction, CBCT*

## 1. INTRODUCTION

Maxillary canines play a vital role in dental occlusion, facial aesthetics, and overall oral function. As key stabilizers of the dental arch, they contribute to proper alignment, balanced occlusion, and smile symmetry. Their long roots and strategic positioning are essential for canine guidance, protecting posterior teeth during lateral jaw movements. However, impaction or malpositioning can lead to functional and aesthetic concerns (Bishara, 1992).

Canine impaction affects approximately 1-3% of the population, occurring more frequently in the maxilla (1-2%) than in the mandible (0.2%) (Dachi & Howell, 1961; Ericson & Kurol, 1988). Among impacted maxillary canines, 85% are palatal and 15% are buccal or labial (Jacoby, 1983). Impaction is more common in females, with a 2:1 female-to-male ratio (Bass, 1982).

The causes are multifactorial, including genetic and environmental factors. The Guidance Theory suggests that lateral incisor anomalies can disrupt the canine's eruption path (Becker, Smith & Behar, 1981), while the Genetic Theory links impaction to hereditary patterns (Peck, Peck & Kataja, 1994). Other factors include arch length deficiency, retained primary canines, and pathological obstructions (Becker, 2012).

Untreated impacted canines may cause root resorption, cyst formation, bone loss, and aesthetic issues (Ericson & Kurol, 2000; Becker, Chaushu & Chaushu, 2013). Early diagnosis through clinical and radiographic evaluation, including CBCT, is crucial (Liu et al., 2008). Treatment ranges from interceptive extractions to surgical-orthodontic approaches or removal (Baccetti et al., 2008; Cowan et al., 2012). An interdisciplinary approach ensures optimal outcomes (Duggal et al., 2017).

This report presents two clinical cases of impacted maxillary canines—one palatal and one buccal—detailing diagnosis, surgical management, and treatment outcomes.

## 2. CASE REPORTS

### Case 1: Palatal Canine Impaction

A 21-year-old healthy female presented with a chief complaint of missing maxillary canines. Clinical examination revealed

no systemic conditions, reddish-pink gingiva with rolled contours, and bleeding on probing. Retained primary canines (#53, 63) were noted. Palpation identified palatal bulges, with adjacent tooth tipping. Canines (#13, 23) were palpable on the palate, with pinpoint exposures visible, confirming palatal impaction.

OPG showed adequate bone levels, impacted #13, #23, #38, #48, and erupting #18, #28. CBCT confirmed palatal impaction of #13 and #23. Since the crowns were covered only by soft tissue, an open approach was chosen. After informing the patient, scaling and root planing were performed, followed by surgery one week later.

The impacted canines were coronally positioned with a prominent palatal bulge. A soft-tissue open technique was chosen and performed under local anesthesia (2% lignocaine with 1:100,000 adrenaline). An incision was made at the most prominent bulge to create a surgical window, which was enlarged to fully expose the crowns. This approach allowed visualization and guided eruption of the impacted teeth. Bleeding was controlled using a pressure pack, and orthodontic brackets were bonded to the enamel. Proper hemostasis and salivary control were ensured before securing the gold button and orthodontic chain to the anatomic crown.

A fixed attachment was bonded to the exposed tooth, and a chain was attached to facilitate orthodontic traction for repositioning. The procedure was complication-free. Postoperative instructions were provided, and the patient was prescribed analgesics and antibiotics (TID for three days) along with 0.2% chlorhexidine mouthwash (10 mL BID for 14 days). At the one-week follow-up, healing was uneventful. Long-term maintenance included re- evaluation.

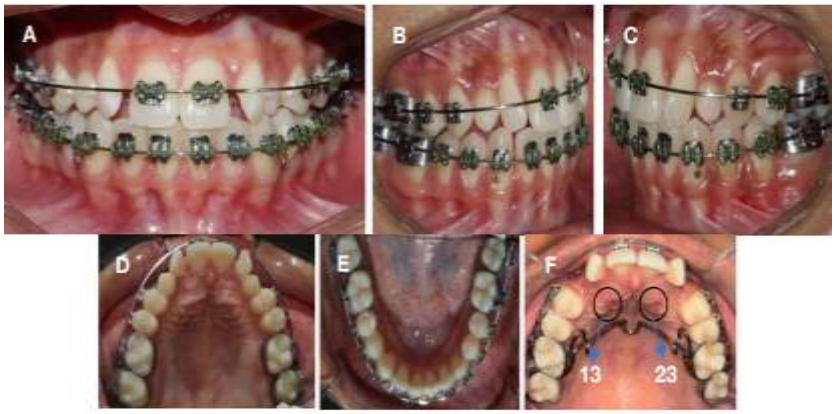


**Figure 1 (A),(B),(C) Frontal and Lateral view to show the retained primary canines (#53, 63). (D),(E) Occlusal view of maxillary & mandibular arch. (F) Occlusal view shows palpable bulges indicative of relatively superficial, palatally displaced canines (arrows).**

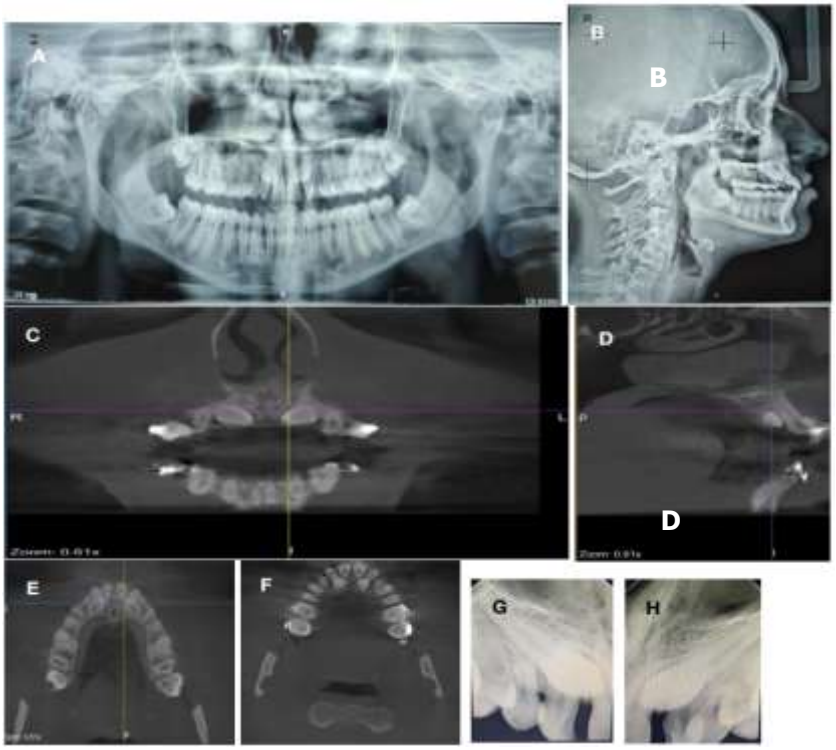

**Figure 2 (A) Pre-treatment panoramic X-ray. (B) Pre-treatment Lateral cephalometric X-ray. (C),(D) CBCT image showing palatally impacted canines, and there is no bone covering their crowns # 13, 23 (E),(F) Panoramic view showing palatally impacted maxillary canine and other dental anomalies. (G),(H) IOPA view of impacted teeth #13 & 23.**


**Figure 3 (A),(B) Open exposure of the Bilateral palatally impacted maxillary canines. (C) A Hemostatic agent (Gelatin Sponge) covers the exposed area, with the aim of controlling the bleeding over the palatal soft tissue. (D) Resin was used to attach the brackets on the exposed crown and orthodontic traction was performed. (E),(F),(G) Follow ups at the interval of 1 week, 1 month & 3 months.**

**Case 2: Labially Canine Impaction**

An 18-year-old male presented with a missing left maxillary canine (#23) and no relevant medical history. Clinical examination showed no retained primary tooth, but a palpable buccal bulge over the alveolar ridge suggested impaction. OPG confirmed the impacted #23, and CBCT revealed a buccal impaction with sufficient space for guided eruption.

An open surgical exposure technique was planned. Periodontal therapy, including scaling and root planing, was performed one week prior. After informed consent, surgery was done under local anesthesia (2% lignocaine with 1:100,000 adrenaline). A buccal flap approach with a vertical incision at the bulge was used. A full-thickness mucoperiosteal flap was elevated, exposing #23 with minimal bone removal. Hemostasis was achieved, and an orthodontic bracket with a gold chain was bonded. The flap was repositioned, sutured with 4-0 resorbable sutures, and the chain was left accessible for orthodontic traction.

The patient was prescribed ibuprofen (400 mg) TID for three days, amoxicillin (500 mg) TID for five days, and 0.2% chlorhexidine mouthwash BID for two weeks. Postoperative instructions included maintaining oral hygiene, following a soft diet, and avoiding trauma to the surgical site.

At the one-week follow-up, the surgical site showed satisfactory healing with no signs of infection or inflammation. Subsequent follow-ups confirmed continued healing, and the patient was referred to the orthodontist for guided traction of #23. No complications, such as gingival overgrowth, infection, or excessive pain, were reported. The procedure was successful, and ongoing follow-ups were planned to monitor the canine's alignment and integration into the dental arch.

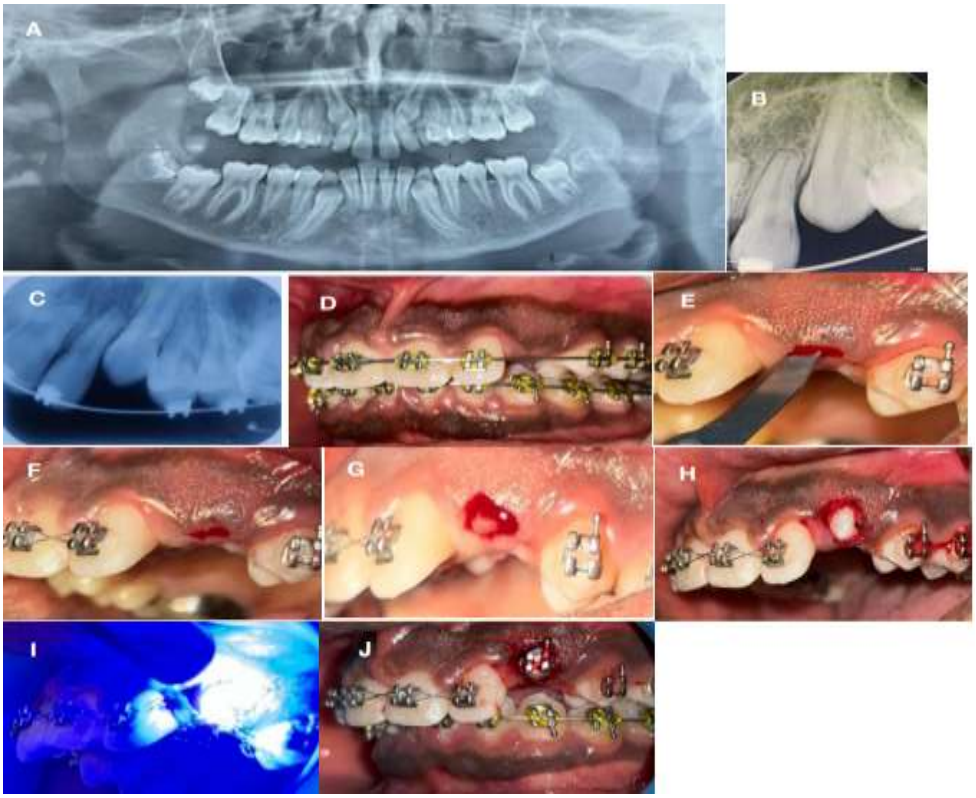


**Figure 4 (A) Pre-treatment panoramic X-ray. (B) Open exposure of the Bilateral palatally impacted maxillary canines. (C) A Hemostatic agent (Gelatin Sponge) covers the exposed area, with the aim of controlling the bleeding over the palatal soft tissue. (D) Resin was used to attach the brackets on the exposed crown and orthodontic traction was performed. (E),(F),(G) Follow ups at the interval of 1 week, 1 month & 3 months.**


**Figure 5 (A),(B),(C),(D) Follow ups at the interval of 1 week, 1 month, 3 months & 8 months.**

## 3. DISCUSSION

Canine impaction results from genetic factors, environmental influences, and anatomical abnormalities. The guidance theory suggests that lateral incisors direct canine eruption, and anomalies like missing, malformed, or misaligned lateral incisors can cause impaction (Bishara, 1992). Genetic studies indicate a familial predisposition (Mossey et al., 1999). Other factors include insufficient arch space, abnormal eruption angulation, and obstructions such as cysts, odontomas, or supernumerary teeth (Ericson & Kurol, 2000).

Early detection prevents complications like root resorption, periodontal damage, and esthetic concerns (Lindauer et al., 1992). Clinically, signs include retained primary canines, absent canine bulges, and displaced adjacent teeth. OPG, IOPA, and CBCT aid in accurate diagnosis (Haney et al., 2010).

Impacted canines can be categorized based on their location, angulation, and depth:

- Location: Canines may be buccally impacted (15%) or palatally impacted (85%), with palatal impactions being more common due to altered eruption pathways (Jacoby, 1983).
- Angulation: The degree of inclination varies, with impactions classified as mild (<30°), moderate (30–45°), or severe (>45°) relative to the occlusal plane (Becker et al., 1999). A steeper angle often makes treatment more complex.

- Depth: Superficial impactions involve minimal bone coverage, whereas deep impactions require more extensive surgical intervention for exposure (Ericson & Kurol, 1988).

Early intervention can promote spontaneous eruption and reduce canine impaction severity. Extracting retained primary canines creates space for proper eruption (Baccetti et al., 2008). Maxillary expansion helps correct crowding, while orthodontic space maintainers and distalizing appliances guide the canine into position, potentially preventing the need for surgery or extensive orthodontic treatment (Lindauer et al., 1992; Bishara, 1992).

The surgical exposure of impacted canines depends on their position relative to the mucogingival junction (MGJ). For labially impacted canines, (Kokich, 2004) described three techniques based on the depth of impaction. The apically positioned flap (APF) is used when the canine is near the surface within keratinized gingiva, preserving attached gingiva for better periodontal stability. The closed eruption technique is preferred for deep impactions, as it repositions the flap after bonding an orthodontic bracket, allowing the canine to emerge in a controlled manner while maintaining soft tissue coverage. A gingivectomy is performed for shallow impactions by removing excess soft tissue, provided enough keratinized tissue remains. Other approaches include the open eruption technique, which fully exposes the canine for immediate orthodontic traction but requires strict oral hygiene to prevent gingival overgrowth and plaque accumulation (Crescini et al., 2007). In cases where orthodontic movement is not possible due to severe displacement or ankylosis, extraction and prosthetic rehabilitation, such as dental implants or fixed bridges, may be necessary (Vanarsdall, 1995).

For palatally impacted canines, the choice of technique depends on the tooth's depth and accessibility. The open window technique, as used in Case 1, creates a soft tissue window over the impacted canine, facilitating natural eruption under orthodontic guidance. The closed eruption technique repositions the flap after bracket bonding, ensuring eruption within keratinized gingiva for improved esthetics (Crescini et al., 2007). If orthodontic traction is not feasible, autotransplantation can surgically reposition the impacted canine, offering high success rates when performed correctly (Ericson & Kurol, 1988). In cases of severe displacement or ankylosis, extraction followed by prosthetic solutions, such as implants or bridges, may be required (Vanarsdall, 1995).

Despite successful surgical exposure and orthodontic traction, complications may occur. Gingival overgrowth is common with open techniques, emphasizing good oral hygiene (Crescini et al., 2007). Infection and delayed healing can be minimized with antibiotics and proper care (Becker & Chaushu, 2003). Root resorption risks highlight the need for early intervention, while gingival recession is better managed with the closed technique (Kokich, 2004).

A multidisciplinary approach optimizes functional, esthetic, and periodontal outcomes (Vanarsdall, 1995), ensuring effective canine repositioning and stability.

## 4. CONCLUSION

The surgical exposure of the canines was effectively performed. The pre- orthodontic uncovering and autonomous eruption technique is a safe and predictable option for treating impacted maxillary canines in adolescents and adults. It requires proper treatment planning with interdisciplinary approach of both a periodontist and orthodontist. Continuous follow up was done for this case with no report of any surgical complication.

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