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Case Presentation

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Transdental Implant Placement as an Alternative to Surgical Extraction of an Impacted Maxillary Canine: A Clinical Report

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Abstract

Background: Conventional treatment of horizontally impacted maxillary canines usually involves a surgical exposure and orthodontic traction, or a surgical extraction, bone augmentation and delayed implant placement. This report describes a minimally invasive alternative using trans-dental implant placement through the impacted tooth.

Methods: A 38 year-old female presented with a mobile deciduous maxillary canine (tooth #63) and a horizontally impacted permanent canine that limited implant placement. CBCT and intraoral scan data were merged to design a 3D-printed surgical guide. After extraction of tooth #63, an implant was placed, with the osteotomy intentionally traversing the impacted canine. An immediate screw-retained provisional crown was delivered. After four months, adefinitive screw-retained monolithic zirconia crown was delivered. At 3-year follow-up, clinical and radiographic evaluation showed stable crestal bone levels, preserved soft tissue architecture, and no biological complications at the tooth-implant interface.

Conclusions: Guided flapless transdental implant placement provided stable functional and esthetic outcomes over 3 years. Preservation of the impacted tooth and surrounding alveolar structures avoided extensive surgical removal and additional bone augmentation. Favorable results were associated with accurate digital planning and controlled execution.This approach may be a viable option in carefully selected cases, although further studies are needed to confirm long-term predictability.

Keywords: Implant placement through impacted tooth; Intra-dental implant placement; Transdental implant placement

Abbreviations: CBCT: Cone-Beam Computed Tomography; ml: Milliliters; mm: Millimeters; Ncm: Newton-centimeters (unit of torque); T-Base / Ti-base: Titanium base

Introduction

Dental implant therapy has become a predictable and widely accepted treatment modality for replacing missing teeth, demonstrating high long-term survival rates and favorable functional and esthetic outcomes [1]. In the anterior maxilla, however, implant placement presents unique challenges due to the high esthetic demands, a thin buccal bone plate, and the close proximity of implants to adjacent roots and surrounding anatomical structures [2]. Several clinical conditions may further complicate implant placement in the esthetic zone, including retained root fragments, impacted teeth, or altered alveolar anatomy resulting from previous pathology or trauma. Conventional treatment protocols in such situations generally involve surgical removal of retained dental structures, followed by delayed implant placement, often combined with bone augmentation procedures to restore lost alveolar volume [3]. While these approaches can be predictable, they may increase surgical morbidity, extend treatment time, and lead to additional alveolar ridge resorption, which may negatively influence the final esthetic result [4]. In highly specific clinical scenarios, alternative implant placement protocols may be considered to avoid extensive surgical procedures or the unnecessary removal of surrounding structures. One such approach is trans-dental implant placement, in which the implant osteotomy intentionally passes directly through a retained, impacted tooth structure. The tooth structure effectively acts as a biologic shield, helping to prevent bone resorption and maintain the surrounding tissue architecture. While this approach deviates from traditional surgical principles of complete extraction, recent clinical reports suggest it can provide stable structural support, represent a highly conservative and tissue-preserving solution when executed with precise digital planning [5]. The purpose of the present case report is to describe a guided flapless placement of a dental implant in the anterior maxilla using a trans-dental approach in a complex anatomical situation. Particular attention is given to the rationale for this treatment strategy, the surgical workflow, and the potential advantages and limitations of this technique in the esthetic zone.

Case Description and Results

A 38-year-old a female patient presented to the clinic with the chief complaint of mobility in the maxillary left primary canine (tooth 63). The patient was medically healthy, reported no systemic diseases, and was a non-smoker. Clinical examination revealed grade III mobility of tooth 63. The surrounding soft tissues appeared generally healthy, and the adjacent permanent teeth were asymptomatic. Radiographic evaluation was performed using periapical radiographs and Cone-Beam Computed Tomography (CBCT). Imaging revealed the presence of a horizontally impacted permanent maxillary canine located apical and palatal to the retained primary canine. The impacted tooth occupied a significant portion of the alveolar bone in the canine region and limited the available bone volume for conventional implant placement.

The initial clinical and radiographic situation is presented in **Figure 1**.

Figure 1: Clinical and radiographic images of initial situation. (A) Frontal view, (B) Intra-oral frontal view, (C) radiographic image**.**

Considering the anatomical situation, several treatment alternatives were discussed with the patient. These included surgical removal of the impacted canine followed by delayed implant placement with possible bone augmentation procedures. However, this approach would require a more invasive surgical intervention and extended treatment time. After discussing the potential risks and benefits of the available options, a conservative treatment strategy was selected consisting of extraction of the retained primary canine followed by guided flapless implant placement using a trans-radicular approach through the impacted canine, with immediate provisionalization. Pre-operative digital planning was performed by combining CBCT data with intraoral scanning. The datasets were merged to create a three-dimensional virtual model of the maxillary arch. Based on the digital planning, a surgical guide was designed and fabricated to allow precise control of implant position, angulation, and depth during surgery.

The surgical procedure was performed under local anesthesia using articaine 4% with epinephrine 1:100,000 (Ubistesin™ Forte 1.7 ml N50 – 3M ESPE Dental AG; Seefeld, Germany). Tooth 63 was atraumatically extracted. A flapless surgical approach was selected in order to preserve the peri-implant soft tissue architecture and maintain the blood supply to the surrounding bone. The surgical guide was positioned intraorally and verified for stability. Guided osteotomy preparation was performed according to the manufacturer's drilling protocol. During osteotomy preparation, the drill intentionally passed through the impacted canine structure as planned during the digital workflow.

A PALTOP Dynamic dental implant 3.75 × 16 mm (PALTOP Advanced Dental Solutions Ltd., Caesarea, Israel) was inserted. Primary stability of 50 Ncm was achieved at the time of implant placement. An

insertion torque of 50 Ncm was achieved at the time of implant placement, indicating excellent primary stability. All surgical procedures are shown in **Figure 2 -5**.

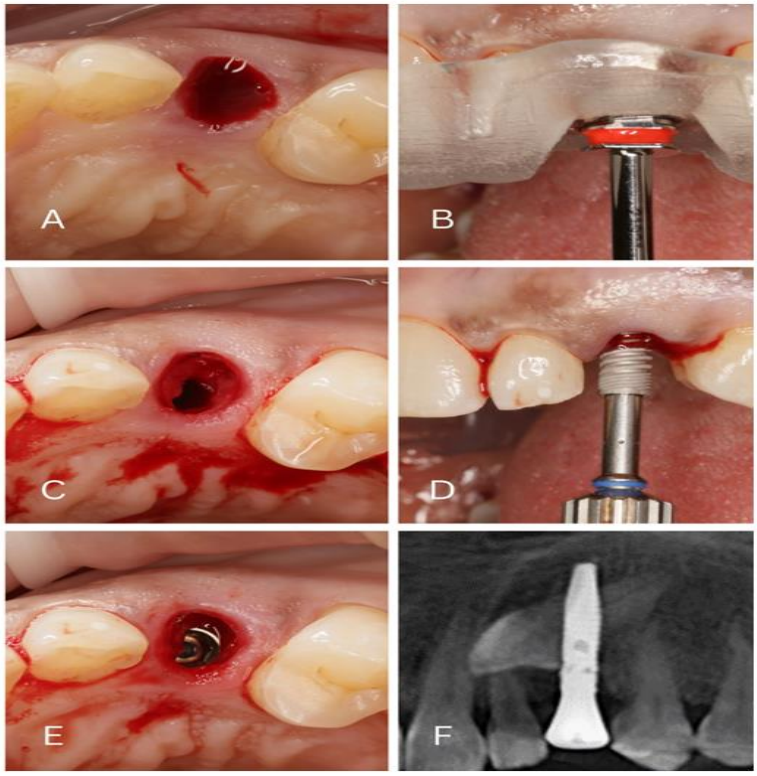

Figure 2: Surgical procedure sequence. **(A)** Occlusal view of the fresh extraction socket. **(B)** Osteotomy initiation utilizing a custom 3D-printed surgical guide. **(C)** Intraoperative periapical radiograph with a drill in situ confirming the planned transdental trajectory. **(D)** Intraoperative radiograph demonstrating the prepared transdental osteotomy tract. **(E)** Occlusal clinical view of the completed osteotomy. **(F)** Clinical view during guided insertion of the implant. **(G)** Clinical view of the implant fully seated within the extraction socket.

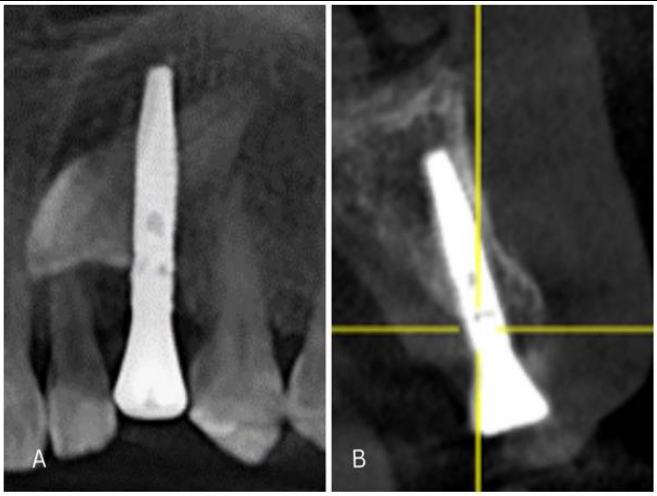

Figure 3: Post-operative CBCT. **(A)** Sagittal view and **(B)** cross-sectional view of the seated implant.

Following implant placement, an immediate screw-retained provisional restoration was placed and adjusted to avoid any occlusal contacts. Immediate postoperative radiographic evaluation confirmed correct implant positioning and angulation according to the pre-operative digital plan.

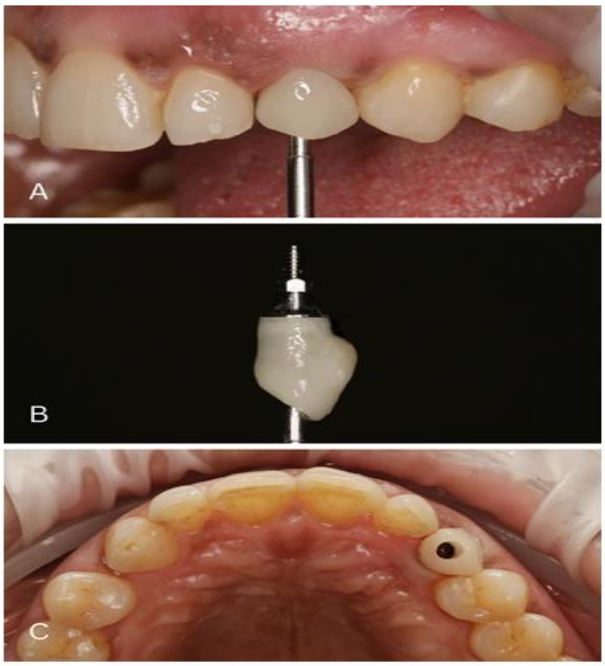

Figure 4: Immediate provisionalization phase. **(A)** Intraoral frontal view of the provisional crown insertion. **(B)** Extraoral view of the custom screw-retained provisional crown. **(C)** Occlusal view showing the seated provisional crown and palatal screw access hole.

After a 4-month healing phase, the peri-implant soft tissues demonstrated healthy conditions without signs of inflammation or recession. A definitive prosthetic restoration consisting of a screw-retained monolithic zirconia crown fabricated on a titanium base (Ti-base) was delivered. The restoration was torqued according to the manufacturer's recommendations and adjusted to achieve proper occlusion. The final clinical outcome demonstrated satisfactory functional and esthetic integration with the adjacent dentition. Radiographic evaluation confirmed stable crestal bone levels surrounding the implant. The patient reported satisfaction with both the esthetic and functional outcomes of the treatment. A 3-year clinical observation of the implant restoration showed stable peri-implant soft tissues and maintained bone levels. There was no evidence of any biological complication at the tooth-implant interface. At the 3-year clinical follow-up, observation of the implant restoration revealed stable peri-implant soft tissues and maintained bone levels. There was no radiographic or clinical evidence of biological complications at the tooth-implant interface.

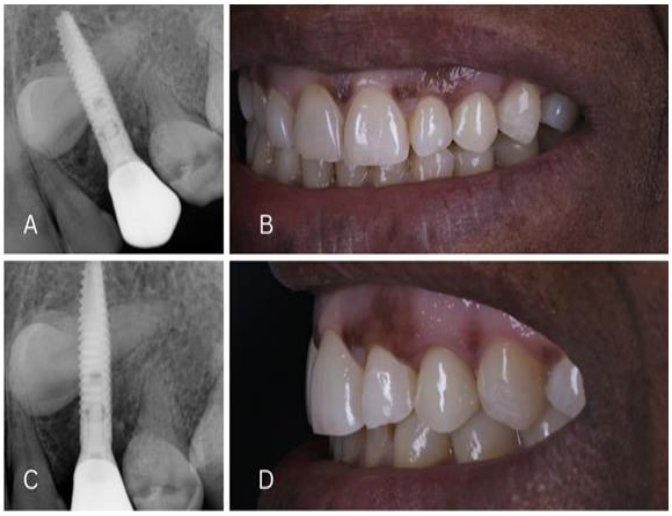

Figure 5: Definitive restoration and long-term follow-up. (A) Periapical radiograph at delivery of the definitive prosthesis, (B) intraoral clinical view of the definitive restoration, (C) periapical radiograph at the 3-year follow-up, (D) intraoral clinical view at the 3-year follow-up.

Discussion

This case demonstrates the successful placement of a dental implant through a horizontally impacted maxillary canine using a fully guided, flapless approach, with immediate provisionalization and stable clinical and radiographic outcomes over a 3year follow-up. Traditionally, impacted maxillary canines are managed by surgical exposure followed by orthodontic traction or, in selected cases, extraction, as described by Saverio Ceraulo et al. [6]. However, in cases of unfavorable positioning, particularly horizontal impaction, treatment becomes more complex and less predictable. Yifat Manor et al. [7] reported that surgical-orthodontic management may be associated not only with treatment failure, such as unsuccessful eruption or non-ideal final

positioning, but also with root resorption of adjacent teeth, prolonged treatment time, and periodontal complications, including gingival recession and attachment loss. When extraction is indicated, surgical removal may require extensive ostectomy and may result in significant alveolar bone defects, damage to adjacent teeth or supporting structures, postoperative morbidity, and the need for subsequent bone augmentation before implant placement. Such interventions are associated with increased morbidity and prolonged treatment duration. In contrast, the present case suggests that under carefully controlled conditions, the impacted tooth can be preserved and incorporated into the implant pathway rather than removed. This approach may help maintain existing anatomical structures, reduce surgical trauma, and streamline the overall treatment process. From a biological standpoint, the primary concern with trans-radicular implant placement is the interaction between the implant surface and dental tissues. A histological study by Jonathan L Gray and Arthur R Vernino **[8]** demonstrated that implants placed into or in proximity to retained root fragments did not induce inflammation and performed comparably to implants placed entirely in bone. In some cases, a mineralized tissue consistent with cementum-like deposition was observed at the implant-tooth interface. These findings are supported by a systematic review by Amel Labidi et al. **[9]**, which reported that implants placed in contact with or through dental tissues can develop mineralized interfaces, including cementum-like and osteodentin-like tissues, a phenomenon described as “mineral integration".

These findings support the present case, which is consistent with this biological behavior, as no complications were observed over a 3year follow-up. This suggests that the retained impacted tooth remained biologically stable and did not interfere with implant integration **[10]**. The flapless surgical approach used in this case may have further contributed to the favorable outcome by minimizing surgical trauma and preserving soft tissue integrity. Maintenance of vascular supply is considered important for preserving crestal bone levels and peri-implant tissue architecture, particularly in the esthetic zone **[11]**. A critical factor in the success of this technique is the use of digital planning and guided surgery. The integration of CBCT imaging with intraoral scanning allows precise three-dimensional visualization, enabling accurate control of implant position, angulation, and depth. This is particularly important when traversing an impacted tooth while maximizing bone engagement **[12]**. The present case provides several clinically relevant insights. First, it suggests that the presence of an impacted tooth does not necessarily mandate its removal before implant placement, provided that the tooth is asymptomatic and that adequate primary stability can be achieved. Second, it supports the concept that the surrounding tooth structure can function as a mechanically stable substrate within the implant osteotomy pathway when combined with sufficient bone support. Third, it highlights the role of digital planning and minimally invasive techniques in expanding the range of feasible implant treatment options while reducing patient morbidity.

However, this approach remains highly case-dependent and should be applied with caution. Careful case selection is essential, including evaluation of the impacted tooth’s position and morphology, the quantity and quality of surrounding bone, and the absence of pathology. Although the 3year follow-up in this case is encouraging, the long-term biological behavior of the tooth–implant

interface remains unclear. Further studies with larger sample sizes and extended follow-up are needed to establish the predictability and safety of this technique. Within these limitations, trans-radicular implant placement through a horizontally impacted canine may represent a viable minimally invasive alternative to conventional surgical approaches in selected cases. By preserving existing anatomical structures and utilizing precise digital planning, this technique has the potential to reduce treatment complexity, shorten rehabilitation time, and maintain favorable esthetic outcomes while ensuring biological and mechanical stability.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References

1. B Mangalekar S, Sharma R, Jalaluddin M, Nadkerny P, Pavani MP, VP, et al. Analyzing stability parameters for assessing immediate and early loading of implants. Bioinformation. 2025;21(8):2807–2810.
2. Buser D, Martin W, Belser UC. Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations. Int J Oral Maxillofacial Implants. 2004;19:43–61.
3. Ceraulo S, Barbarisi A, Oliva B, Moretti S, Caccianiga G, Lauritano D, et al. Treatment Options in Impacted Maxillary Canines: A Literature Review. Dent J. 2025;13(9).
4. Chatzopoulos GS, Wolff LF. Assessing the Long-Term Survival of Dental Implants in A Retrospective Analysis: Immediate Versus Delayed Placement. Clin Exp Dent Res. 2025;11(1):e70096.
5. Gray JL, Vernino AR. The interface between retained roots and dental implants: a histologic study in baboons. J Periodontol. 2004;75(8):1102–1106.
6. Ku JK, Lee J, Lee HJ, Yun PY, Kim YK. Accuracy of dental implant placement with computer-guided surgery: a retrospective cohort study. BMC Oral Health. 2022;22(1):8.
7. Labidi A, Bekri S, Mansour L, Ghoul-Mazgar S. Implants Placement in Contact with Dental Tissue: A Potential Paradigm Shift? Systematic Literature Review. Eur J Dent. 2019;13(04):642–648.
8. Manor Y, Kaganovich M, Gamliel M, Sadan N, Shmuly T. Factors Contributing to Complications and Failures of Impacted Canines Undergoing Surgical Orthodontic Treatment: A Retrospective Cohort Study. J Clin Med. 2026;15(4).
9. Pérez-González F, Sánchez-Labrador L, Molinero-Mourelle P, Sáez-Alcaide LM, Cortés-Bretón-Brinkmann J, Torres García-Denche J, et al. Dental implant placement through impacted teeth or residual roots as an alternative to invasive extraction surgeries: a systematic literature review. Br J Oral Maxillofacial Surg. 2021;59(10):1120–1129.

10. Tandale U, Chalmela BK, Mahale K, Khalikar S, Rajguru V, Mahajan S. Impacted Teeth vs Immediate Post-extraction Implants: A Review of Survival, Marginal Bone Loss, and Complications. J Adv Med Med Res. 2026;38(1):58–68.
11. Tarpara KJ, Goyal R, Sheshamani N, Singh N, Kumar H, Mirdah WF, et al. Comparative Assessment of Clinical Outcomes in Flapless and Flapped Implant Surgical Techniques: A Prospective Cohort Study. Cureus. 2025;17(4):e82547.
12. Yoon NS, Choi H, Kim HG, Sohn DS. Retrospective Radiographic Evaluation of Ridge Dimensional Changes After Vertical Augmentation Using the Novel Wide-Head Tent Pole Screw Technique. J Funct Biomater. 2025;16(6).

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