# TITLE PAGE

**Management of Single Tooth Replacement in the Esthetic Region Using Immediate Implant Placement: A Case Report**

**Authors: Manish Rathi1 , BDS, MDS, MPerio (RCSEd)**

**Affiliation: 1.Asst Prof, ADC(R&R), New Delhi, India.**

**Correspondence to: Manish Rathi, Dept of Periodontology, ADC (R&R), New Delhi, India. Email:** [**manishrathi.077h@gov.in**](mailto:manishrathi.077h@gov.in)

**Tel: +919971238331**

**Orcid ID:** **0000-0002-7689-2506**

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**CONFLICT OF INTEREST STATEMENT**

The author has no conflicts of interest to declare.

# Abstract

**Objective**: This case report aims to illustrate the management of single tooth replacement in the esthetic region using immediate implant placement, highlighting the importance of interdisciplinary treatment planning and adherence to esthetic principles.

**Clinical Considerations**: A 37-year-old female presented with a fractured upper front tooth, necessitating immediate attention to restore esthetic harmony. Surgical intervention involved a complex approach, including mucoperiosteal flap elevation, guided bone regeneration (GBR) with alloplast bone graft, and adjunctive soft tissue grafting. Preoperative assessment using the SAC assessment tool of ITI revealed high esthetic complications, leading to simultaneous bone augmentation. The second-stage operative care incorporated connective tissue grafting and platelet-rich fibrin application to enhance soft tissue volume and contour.

**Conclusion**: Through rigorous planning and execution, the patient achieved favorable esthetic outcomes with significant improvements in the Pink Esthetic Score (PES) and White Esthetic Score (WES) assessments at the six-month post-operative evaluation. Immediate implant placement, when performed with interdisciplinary collaboration and adherence to evidence-based protocols, offers a conservative approach to achieving predictable esthetic results while respecting functional and biological principles.

**Keywords**: Immediate implant placement, esthetic zone, interdisciplinary treatment, soft tissue management, guided bone regeneration.

**Summary Box:**

**What is already known**

* Immediate implant is predictable method for placing implant in anterior esthetic region
* Reduced morbidity with immediate implant placement

**What is new?**

* Step by step detailed management using SAC Assessment Tool by International Team of Implantologists(ITI) and therefore complication management to correct the esthetics by second stage follow up procedure
* Correcting ‘microesthetics’ and thereby improving ‘tangible benefits’ to the patients for which patient was unaware including 3 years post-operative review.

# 1) INTRODUCTION

Achieving a lovely smile involves considerations beyond mere functionality, encompassing both functional and esthetic aspects.1 Integrated treatment planning is frequently required to successfully reconcile face characteristics and dental proportions.2 Orthodontic interventions may precede esthetic rehabilitation to minimize invasive procedures.3 Soft tissue management plays a crucial role in achieving integration between soft and hard tissues,4,5 while digital resources enable virtual patient simulations for comprehensive treatment planning. This case report explores the utilization of immediate implant placement for single tooth replacement in the esthetic zone, emphasizing optimal esthetic outcomes 6 with high predictability and minimal risk of complications.

# 2) CASE REPORT

A consenting 37-year-old female patient presented with a chief complaint of a fractured upper front tooth accompanied by swelling for three days (see [Figure 1](#_heading=h.qkc2iajz5bs0)). Past dental history revealed root canal treatment one year prior, followed by restoration with a porcelain-fused-to-metal (PFM) crown. General medical, dental, and family histories were unremarkable. Clinical examination indicated a well-oriented patient with moderate build and adequate nourishment. Vital signs were within normal limits. Preoperative Assessment was carried out using the SAC assessment tool of ITI. The surgical procedure is ‘Complex’. SAC surgical assessment also revealed that there was a high esthetic complication associated with the procedure and suggested simultaneous bone augmentation along with adjunctive soft tissue grafting. So the case was planned considering the ITI treatment guidelines.

## 2.1) SURGICAL PROCEDURE

The surgical approach involved mucoperiosteal flap elevation to access the bony defect post-atraumatic extraction ([figure 2](#_heading=h.uun3rpm718a9)). Immediate implant placement was performed, followed by guided bone regeneration (GBR) using alloplast bone graft with collagen membrane stabilization. Subsequent closure of the surgical site ensured optimal healing conditions ([figure 3](#_heading=h.vaauifoq1nil)). After 06 months, Surgical site revealed satisfactory hard and soft tossue ridge dimensions in apico-coronal direction. However, there was soft tissue ridge deficiency in the buccolingual direction when viewed from the occlusal aspect. Therefore, 2nd stage soft tissue grafting procedure using connective tissue graft was planned.

## 2.2) 2ND STAGE OPERATIVE CARE

After full thickness mucoperiosteal elevation was carried out, implant thread exposure was evident which was treated with Guided Bone Regeneration procedure using a mixture of autogenous graft and xenograft. Particulate autogenous graft was harvested from the operative site apical to the implant using 4.0 mm diameter trephine burs. The surgical site is then covered with a resorbable collagen membrane which is stabilized and secured with 5-0 vicryl sutures. During the second stage surgical procedure, a connective tissue graft (CTG) harvested from the palate was sutured onto the inner aspect of the labial flap to enhance soft tissue volume and contour ([figure 4](#_heading=h.8oeirwg29fya)). Platelet-rich fibrin (PRF) application served as a palatal bandage to facilitate wound healing ([figure 5](#_heading=h.l2d7t44cfi94)) ([figure 6](#_heading=h.5jbrbo9ycpu6)).

## 2.3) RESULTS

At the six-month post-operative evaluation, the implant demonstrated primary stability with an insertion torque of 50Ncm. Pink esthetic score (PES) and white esthetic score (WES) assessments revealed significant improvements compared to pre-operative values, indicating favorable esthetic outcomes. Microesthetics were corrected by restoring 11 with ceramic crown and esthetic restoration on 22.

# 3. DISCUSSION

In this study, we aimed to address several hypotheses related to the effectiveness of immediate implant placement in achieving optimal esthetic outcomes in the anterior maxilla. Our first hypothesis was that immediate implant placement would result in favorable esthetic outcomes with high predictability and minimal risk of complications. The experimental data upheld this hypothesis, as demonstrated by the significant improvements in the Pink Esthetic Score (PES) and White Esthetic Score (WES) assessments at the six-month post-operative evaluation [(Table 1)](#_TABLE_1_|). These findings are consistent with previous research by Chen and Buser (2014),6 who reported favorable esthetic outcomes following immediate implant placement in the anterior maxilla.

Contrary to our second hypothesis, which anticipated challenges in achieving optimal peri-implant soft tissue seal, we found that rigorous surgical technique and post-operative care resulted in primary stability of the implant and significant improvements in esthetic outcomes. This contrasts with the concerns raised by Chappuis et al. (2018) 4 regarding the effectiveness of contour augmentation with guided bone regeneration, suggesting a higher risk of esthetic complications associated with complex surgical procedures.

The integration of connective tissue grafting and platelet-rich fibrin application during the second stage surgical procedure further contributed to enhanced soft tissue volume and contour, supporting our third hypothesis. These findings are consistent with the recommendations of Furhauser et al. (2005),5 who emphasized the importance of soft tissue evaluation in implant dentistry and proposed the Pink Esthetic Score (PES) as a reliable assessment tool.

Combining the knowledge gained from these findings, we conclude that immediate implant placement, when performed with rigorous planning and execution, can lead to predictable and favorable esthetic outcomes in the anterior maxilla. This study contributes to the existing literature by providing evidence-based insights into the management of single tooth replacement in the esthetic zone using immediate implant placement. This is further supported by postoperative stable results when patient was reassessed after 02 years[.(Figure 7)](#_FIGURE_7_|)

However, it is essential to acknowledge the limitations of this study. As this is a case report with a 02 years follow-up period this restricts the generalizability of the findings. Furthermore, the study focused primarily on esthetic outcomes and did not assess long-term implant success rates or patient-reported outcomes. Future research should aim to address these limitations by conducting larger-scale prospective studies with longer follow-up periods, incorporating patient-reported outcomes and assessing implant survival rates.

# 4. CONCLUSION

Immediate implant placement necessitates rigorous planning and execution to attain desirable esthetic outcomes. Understanding of hard and soft tissue anatomy, micro-esthetics, and patient expectations is imperative for evidence-based treatment planning and successful implant therapy. Integrating interdisciplinary approaches enhances predictability and ensures comprehensive care in restorative dentistry.

# DISCLOSURE

The author declares that they do not have any financial interest in the contents included in this article.

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**FUNDING INFORMATION**

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**CONFLICT OF INTEREST STATEMENT**

The author has no conflicts of interest to declare.

**DATA AVAILABILITY STATEMENT**

The data is available from TBA.

## ETHICS STATEMENT

## Written informed consent was obtained from the patient for publication of this case report.

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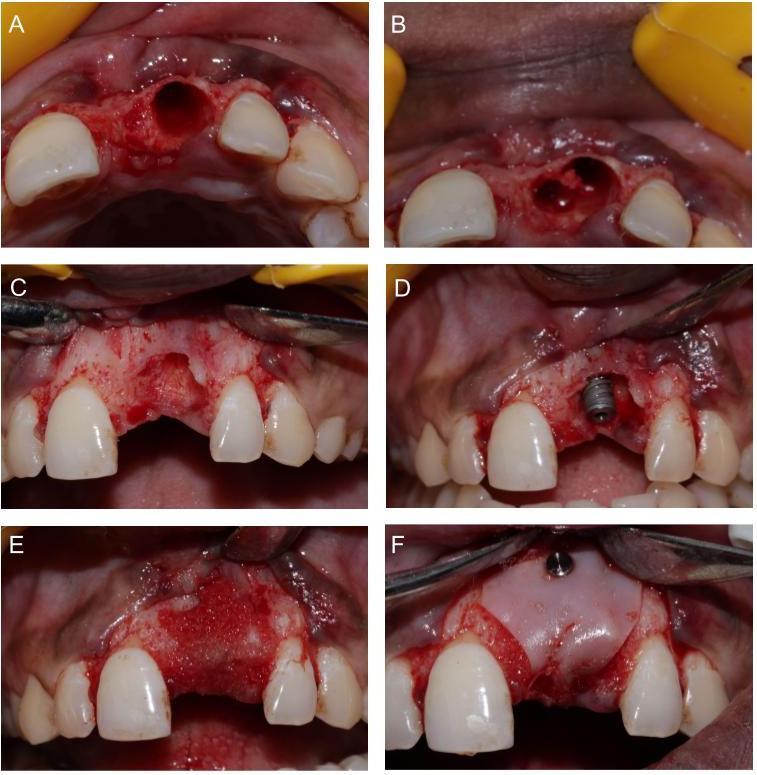
# TABLES

#### TABLE 1 | Pink esthetic score (PES) and white esthetic score (WES) assessments

|  |  |  |
| --- | --- | --- |
|  | **Pre-operative** | **Post-operative** |
| **Pink esthetic score** | 3 | 9 |
| **White esthetic score** | 2 | 9 |
| **Total** | 5/20 | 18/20 |

# FIGURES

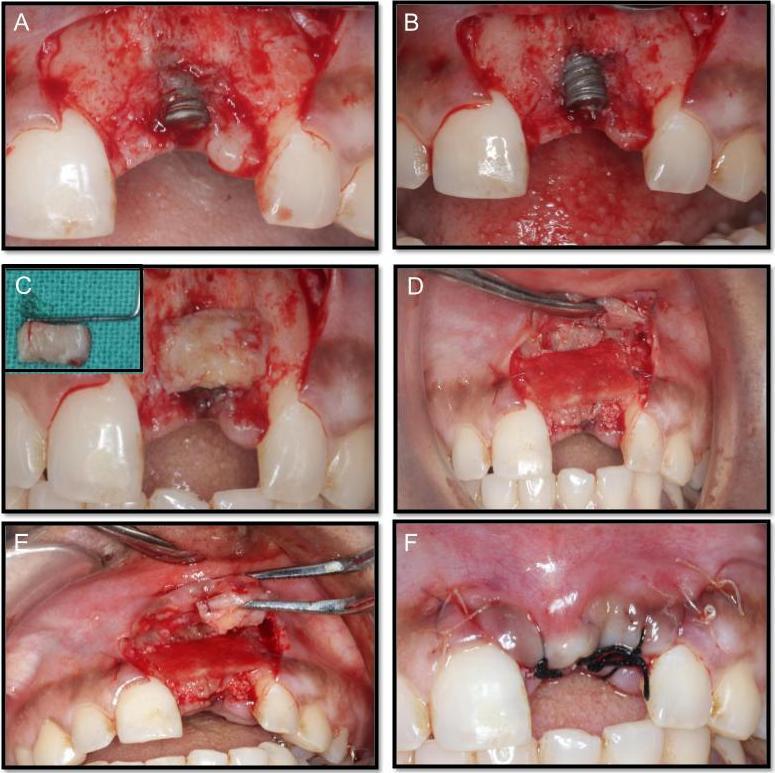
#### FIGURE 1 | Initial situation. A | Cone Beam Computed Tomography. B | Fractured upper front tooth, with evidence of swelling for a duration of three days (yellow circle). Evidence of deterioration is shown with arrows.



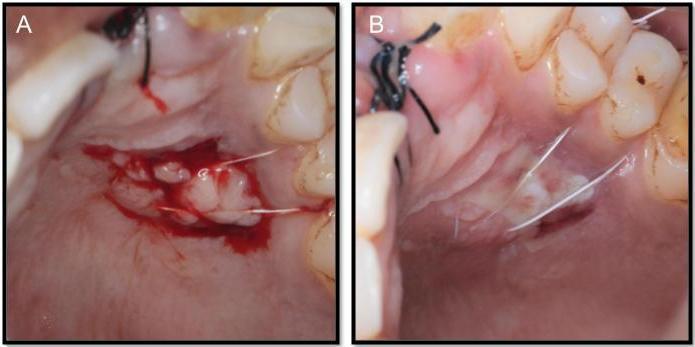
#### FIGURE 2 | A | Extraction socket wrt 21. B | Implant site prep. C | Bony defect post atraumatic extraction wrt 21. D | Immediate implant placed. E | GBR using alloplast bone graft. F | Collagen membrane stabiilised using tac pin.



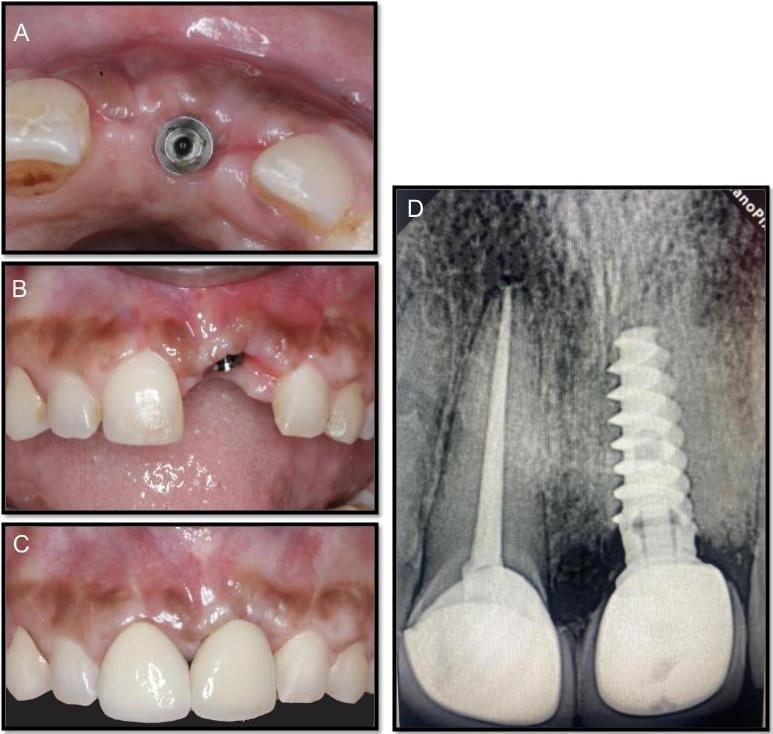
#### FIGURE 3 | Post-operative. A | anterior view. B | occlusal view showing labial deficiency in volume compared to adjacent tooth.



#### FIGURE 4 | A & B | Implant exposure. C | Inset: Connective Tissue Graft (CTG) harvested from palate. Graft checked for the dimensions. D | Guided Bone Regeneration using mixture of autologous and xenograft with collagen membrane. E | CTG sutured on the inner aspect of the labial flap. F | Primary closure of flap.



#### FIGURE 5 | A | Platelet-Rich Fibrin as palatal bandage. B | Palatal wound healing after 48 hrs.



#### FIGURE 6 | Post-operative (6 months). A | occlusal view of implant. B | Frontal view of implant. C | anterior view of full implant. D | Radiovisiograph of implant.

#### FIGURE 7 | Post-operative (3 years). Stabilized soft tissues with a band of keratinized tissue from the gingival margin.Close-up of teeth and gums Description automatically generated