

# Immediate Implant Placement and Guided Bone Regeneration in the Anterior Esthetic Zone: A 5-year Follow-up

Lanka Mahesh<sup>1</sup>, Praful Bali<sup>2</sup>, Sagrika shukla<sup>3</sup>, Sushmita<sup>4</sup>

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## ABSTRACT

Anterior implant placement in the aesthetic zone is one of the most demanding procedures in modern implant dentistry. Achieving a successful outcome requires precise surgical technique and thoughtful management of both hard and soft tissues to restore optimal function and esthetics. This case describes anterior rehabilitation of a 40-year-old male patient with immediate dental implants who presented with root stumps and severe bone loss in the anterior maxillary region.

**Keywords:** Anterior, Bonegraft, Esthetics, Implants, Xenograft.

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## INTRODUCTION

Implant placement in anterior aesthetic zone presents with multiple challenges such as restoration of soft tissue and hard tissue for adequate esthetics and function. Achieving a successful outcome requires precise surgical technique and thoughtful management from the time implants are placed till the restoration. Care should always be taken in terms of resorption of buccal bone hence proper planning of implant placement in the anterior zone becomes crucial. The case here discusses key factors required in the success of implants in anterior aesthetic zone.<sup>1</sup>

## CASE REPORT

A 40-year-old male patient visited dental clinic with a chief complaint of broken front teeth and wanted a replacement for the same. On examination, patient did not have any medical condition. Intraorally, root stumps were present in relation to 21, 22, 23, 24 and previously fractured post and core treatment (Figs 1 and 2). Clinical and radiographic evaluations, including cone-beam computed tomography (CBCT), which revealed sufficient apical bone for primary implant stability (Fig. 2); however, there was moderate resorption of the buccal bone plate, posing a challenge for ideal implant positioning and long-term aesthetic success.

A decision was made to proceed with immediate implant placement using the Nobel Biocare Active and Active TiUltra

<sup>1,4</sup>Private Practitioner, The Specialist Clinic, Delhi, India

<sup>2</sup>Private Practitioner, Bali Dental Center, Delhi, India

<sup>3</sup>The Specialist Clinic, Delhi, India

**Corresponding Author:** Lanka Mahesh, Private Practitioner, The Specialist Clinic, Delhi, India, Phone: 9811268584, e-mail: drlanka.mahesh@gmail.com

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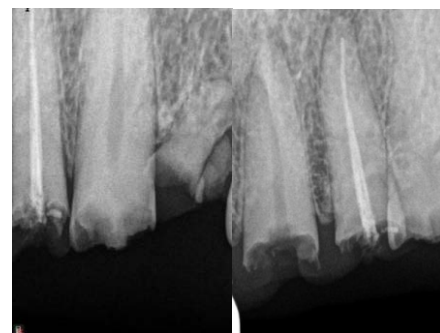
**Conflict of interest:** Dr Lanka Mahesh is associated as the Editor-in-chief and Dr Praful Bali is associated with Assistant Editors of this journal and this manuscript was subjected to this journal's standard review procedures, with this peer review handled independently of these editorial board members and their research groups.

**Patient consent statement:** The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.

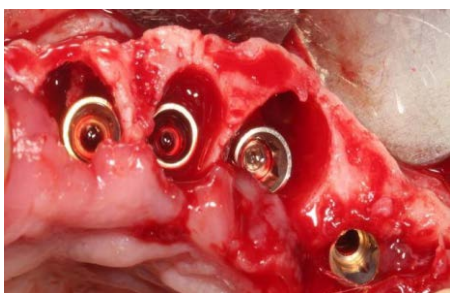
implant systems (Fig. 3).<sup>2</sup> To address the buccal defect and enhance bone volume, simultaneous guided bone regeneration (GBR) was performed. A xenograft material (Ti-OSS) (Chiywewon, S. Korea) was placed at the defect site (Fig. 4A), and stabilization



Fig. 1: Intraoral image showing root stumps



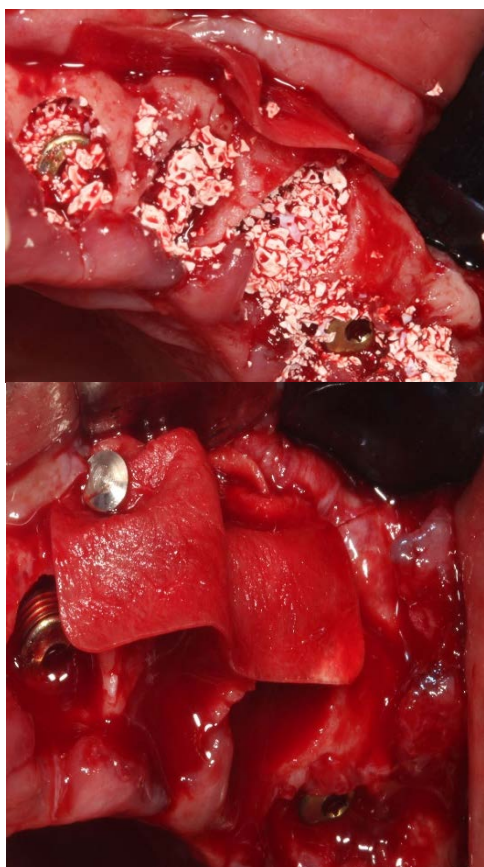
Figs 2A and B: Preoperative Radiographs



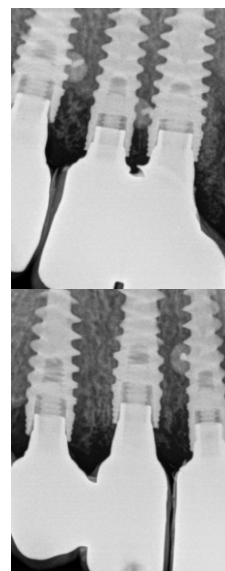
**Fig. 3:** Placement of immediate implants



**Fig. 6:** Emergence profile



**Figs 4 A and B:** (A): Use of xenograft, Tio-oss for adequate regeneration; (B) Membrane with tacks



**Fig. 7:** Radiographs of prosthesis placement



**Fig. 8:** Final image after placement of prosthesis



**Fig. 5:** At suture removal, showing tissue quality

was achieved using a Creos™ membrane secured with membrane tacks (BIONER, Spain) (Fig. 4B). A healing abutment was

placed at the time of surgery to support and guide soft tissue healing, allowing for ideal emergence profile development.<sup>3</sup> Postoperatively, antibiotic and anti-inflammatory regimen was prescribed along with Blue-M mouth-rinse for 10 days. At suture removal after 10 days, healing was uneventful, without any discomfort to the patient (Fig. 5).

After a four-month healing period, clinical examination revealed excellent soft tissue adaptation and bone regeneration around the implant (Fig. 6). The prosthetic phase included the placement of healing collars, followed by a custom jig trial using GC Pattern Resin, and an open-tray impression technique for accurate replication of implant positioning. A zirconia crown was fabricated

and placed, blending harmoniously with the adjacent teeth in both color and contour. The final prosthesis demonstrated excellent functional stability and aesthetic integration (Fig. 7). Final smile line can be appreciated (Fig. 8).

## DISCUSSION

Highly aesthetic outcomes have become key elements which are critical in defining success in implant restorations especially in the anterior zone. Long-term studies have demonstrated that single or multiple implants in aesthetic zone are predictable with high survival rates. There are several factors contribute to this “success” including patient’s healing capabilities, the level and condition of the existing soft and hard tissue, and provisional and final restorations. Few other factors are:

- Proper clinical evaluation and planning
- Atraumatic extraction in terms of bony destruction
- Placement of implants
- Design of the implant used
- Use of type of bone graft for long term effects
- Peri-implant soft tissue management
- Immediate provisionalization
- Gingival biotype.

In the current case report, clinicians have taken care of most of the factors in providing predictable results in the anterior zone. The case also underscores several key factors that contributed to a predictable and successful outcome:

- 3D Treatment Planning: The use of CBCT-based planning enabled accurate assessment of available bone volume and facilitated prosthetically driven implant positioning. This step is critical for avoiding labial perforation and ensuring long-term soft tissue stability.
- Hard and Soft Tissue Augmentation: Simultaneous guided bone regeneration (GBR) using xenograft material and a resorbable membrane helped reconstruct the horizontal ridge deficiency and supported the facial contour. Healing abutments placed during surgery preserved the peri-implant mucosa and shaped the emergence profile.<sup>4,5</sup>
- Collaborative, Experienced Approach: The procedure was performed under the guidance of an experienced surgical and

restorative team. Such interdisciplinary collaboration is essential in aesthetically demanding cases to ensure optimal implant positioning and prosthetic design.

- Use of Advanced Biomaterials and Zirconia Crowns: TiUltra implant surfaces, xenograft bone substitute, and Creos™ membranes contributed to favorable biological responses and bone stability. Final restoration with monolithic zirconia crowns allowed for excellent color matching, strength, and tissue compatibility, ensuring a lifelike esthetic result.

This case highlights how modern digital planning, advanced biomaterials, and a multidisciplinary approach can overcome anatomical limitations and deliver predictable esthetic and functional outcomes in anterior implant rehabilitation.

## CONCLUSION

This case illustrates the successful rehabilitation of a partially edentulous anterior maxilla through immediate implant placement with guided bone regeneration. A collaborative, interdisciplinary approach was key to managing the anatomical and aesthetic challenges of the anterior zone. The use of advanced planning, biomaterials, and prosthetic techniques resulted in a stable, functional, and highly aesthetic outcome.

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