

Immediate Implant Placement and Loading of Multiple Implants in the Anterior Maxillary Esthetic Zone: A Clinical Case Report

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ABSTRACT

Background: Immediate implant placement and immediate loading have gained significant clinical acceptance for reducing treatment time and enhancing esthetic outcomes, particularly in the anterior maxillary region. Although immediate protocols for single-tooth replacement are well documented, the placement and loading of multiple implants in the esthetic zone present additional anatomical, biomechanical, and esthetic challenges. **Aim:** This clinical case report describes the surgical and prosthetic management of immediate implant placement and immediate loading of multiple implants in the anterior maxillary esthetic zone, with emphasis on short-term clinical performance and esthetic stability. **Methods:** A 22-year-old male underwent extraction of compromised maxillary central incisors followed by immediate placement of two JD implants (3.7 × 13 mm) in D2 bone. Adequate primary stability permitted immediate provisionalization. Clinical evaluation and CBCT assessment were performed at 3 months, with radiographic and clinical follow-up continued to 6 months. **Results:** A 22-year-old male underwent extraction of compromised maxillary central incisors followed by immediate placement of two JD implants (3.7 × 13 mm) in D2 bone. Adequate primary stability permitted immediate provisionalization. Clinical evaluation and CBCT assessment were performed at 3 months, with radiographic and clinical follow-up continued to 6 months. **Conclusion:** Immediate placement and immediate loading of multiple implants in the anterior maxilla can achieve predictable short-term functional and esthetic outcomes when sufficient primary stability and well-planned prosthetic protocols are ensured. This case reinforces the importance of appropriate case selection and technical precision in achieving optimal results in esthetically demanding regions.

1. INTRODUCTION

Immediate implant placement with immediate loading has gained increasing acceptance as a predictable treatment modality for replacing teeth in the anterior maxilla, where esthetic demands are high and preservation of peri-implant soft-tissue morphology is critical. This approach seeks to shorten overall treatment time, minimize surgical interventions, and maintain the post-extraction alveolar contour, offering significant advantages over delayed protocols when carefully selected criteria are met (Chen, 2014 ; Esposito, 2010 ; Lang, et.al., 2010).

Despite these benefits, the anterior maxillary esthetic zone presents unique anatomical and biomechanical considerations. The thin buccal cortical plate, variable bone density, and high scalloped gingival architecture increase the risk of mid-facial recession and marginal bone remodeling (Chappuis, et.al., 2000 ; Buser, 2004 ; Carini, 2014). Consequently, immediate protocols in this region require meticulous surgical execution, atraumatic extraction, and three-dimensional implant positioning to maintain esthetic harmony (Buser, et.al., 2004 ; Carini, 2014 ; Seibert and Salama, 2000). Achieving high primary stability—often challenged by D2–D3 bone quality—is considered essential for successful immediate loading (Ganeles, et.al, 2001 ; Brunski, 1992). A growing body of evidence indicates that, when appropriate primary stability and controlled occlusal forces are ensured, immediate placement and loading can demonstrate survival and success rates comparable to conventional delayed approaches (Zafar, et.al., 2020 ; Cheng, 2020). Moreover, immediate provisionalization can favorably influence the maturation of peri-implant soft tissues and contribute to optimized esthetic outcomes (Kan, et.al., 2003 ; Arora., 2016). Collectively, the literature suggests that careful case selection, refined surgical protocols, and prosthetically driven planning are fundamental to achieving predictable results in the esthetic zone. The objective of this case report is to document the clinical workflow and short-term outcomes of immediate implant placement and loading of multiple implants in the anterior maxillary esthetic zone. The report focuses on the clinical feasibility, soft-tissue response, and early functional performance of the implants placed under immediate loading conditions.

2. METHOD

2.1 Study Design

This clinical case report outlines the diagnostic, surgical, and prosthodontic protocol for immediate implant placement and immediate loading of two maxillary central incisors in the anterior esthetic zone. All procedures were performed in accordance with established clinical guidelines for immediate implant therapy.

2.2 Patient Information

A 22-year-old male, medically healthy and without relevant systemic conditions or parafunctional habits, presented with non-restorable maxillary right and left central incisors indicated for extraction and implant-supported rehabilitation.

2.3 Clinical and Radiographic Assessment

Comprehensive intraoral examination revealed extensive structural compromise of teeth UR1 and UL1 with intact soft-tissue architecture and maintained interdental papillae. Periodontal parameters were within normal limits.

A panoramic radiograph was obtained for initial evaluation (Figure 1), followed by a CBCT scan (Figure 2) to assess alveolar bone morphology, root anatomy, and implant feasibility. Both central incisor sites demonstrated adequate vertical and horizontal dimensions and exhibited D2 bone quality.

A maxillary diagnostic wax-up was performed to guide esthetic planning and facilitate fabrication of a custom surgical guide.

2.4 Surgical Procedure

Local anesthesia was administered. Atraumatic extraction of both central incisors was carried out to preserve the integrity of the buccal cortical plate. A full-thickness mucoperiosteal flap was elevated for optimal visualization (Figure 3), and socket debridement was completed to remove granulation tissue and ensure a clean osteogenic bed.

Osteotomies were prepared using the surgical guide to achieve correct three-dimensional positioning. Two JD implants (3.7 × 13 mm) were placed in the central incisor sites with insertion torque sufficient to support immediate loading. Temporary abutments were secured to the implants following placement.

2.5 Immediate Loading Protocol

The internal aspect of the laboratory-processed provisional bridge was hollowed and relined with bis-acrylic resin to obtain passive adaptation over the temporary abutments.

All occlusal contacts in centric, lateral, and protrusive movements were eliminated, ensuring nonfunctional immediate loading. The provisional restoration was finished, polished, and inserted on the same day as surgery.

2.6 Postoperative Care

The patient was instructed to maintain a soft diet for 2 weeks, avoid brushing the surgical area for 1 week, and use chlorhexidine mouthwash for 7 days. Follow-up visits were scheduled during the healing period.



Figure 1. Preoperative panoramic radiograph demonstrating compromised maxillary central incisors and general dental condition.

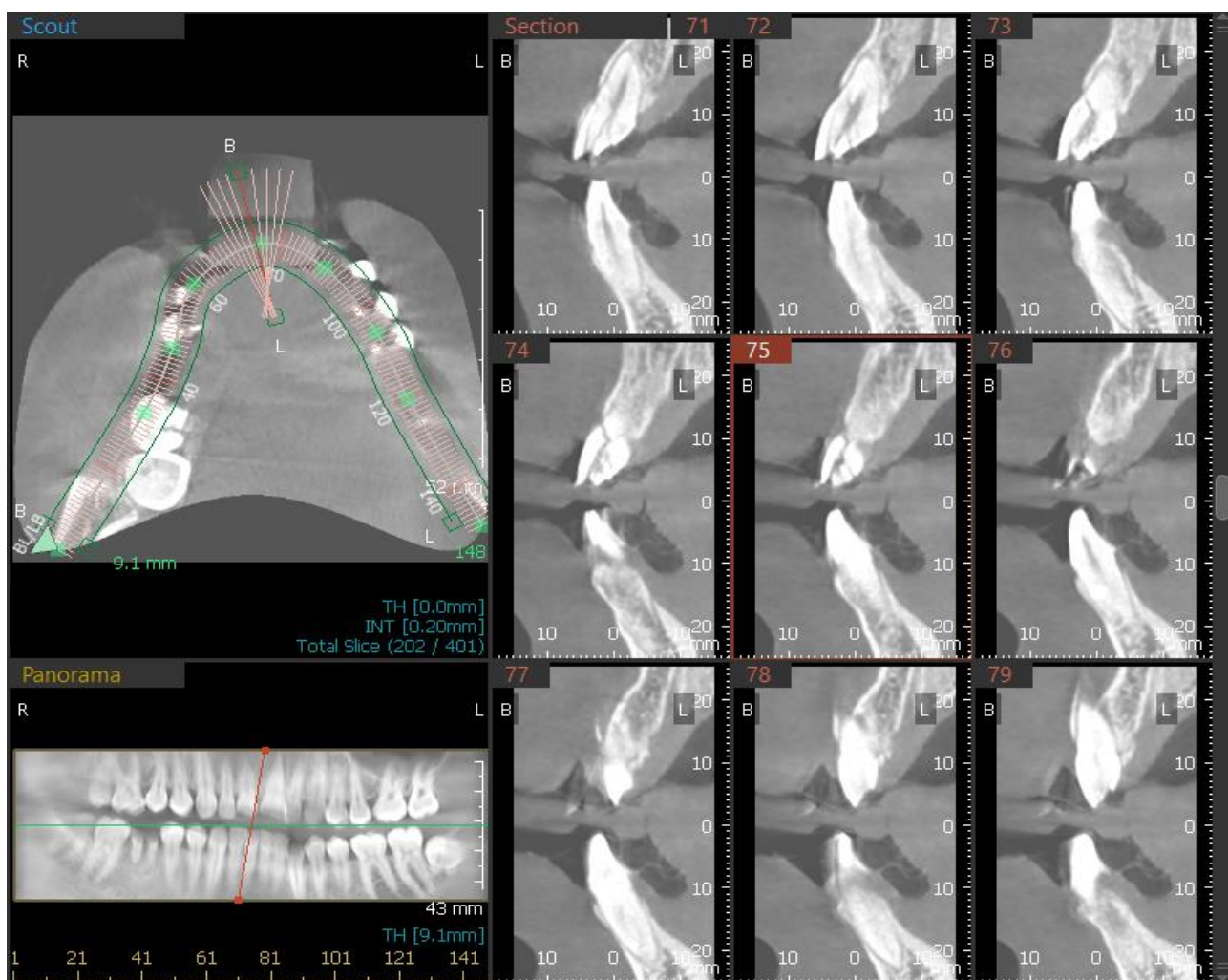


Figure 2. CBCT assessment demonstrating sagittal sections, ridge morphology, and ideal implant positioning in the anterior maxilla.



Figure 3. Intraoperative view following atraumatic extractions and placement of immediate implants with sutured soft tissues.

3. ETHIC APPROVAL

All surgical and prosthetic procedures pertaining to this clinical case were carried out at the Ajiad Centre for Dental Medicine and Implantology, Sirman, Libya. These procedures were executed following the acquisition of written informed consent from the patient, ensuring strict adherence to all applicable ethical and professional guidelines.

4. RESULT

Immediate implant placement and immediate loading of the two maxillary central incisors were performed without intraoperative or postoperative complications. Early healing progressed uneventfully, and the provisional restoration remained stable throughout the initial healing period.

At the three-month follow-up, clinical examination (Figure 4) showed healthy peri-implant soft tissues with stable gingival contours and no signs of inflammation, recession, or prosthetic interference. The provisional restoration displayed good integrity, with no screw loosening, fracture, or functional instability.



Figure 4. Intraoral clinical view demonstrating stable peri-implant soft-tissue architecture and intact provisional restorations at the maxillary central incisors during the postoperative evaluation period at 3-month follow-up.

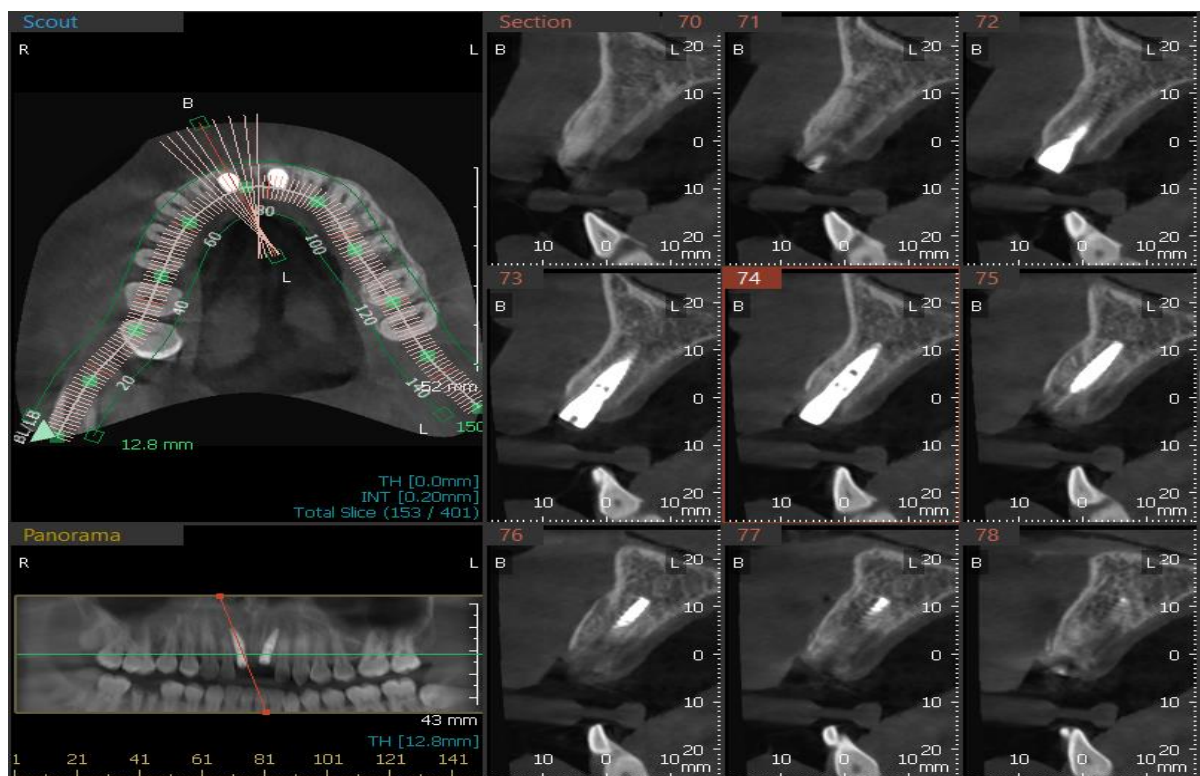


Figure 5. CBCT cross-section of the upper right central incisor implant showing maintained peri-implant bone levels, intact buccal plate morphology, and precise implant positioning at 3-month follow-up.

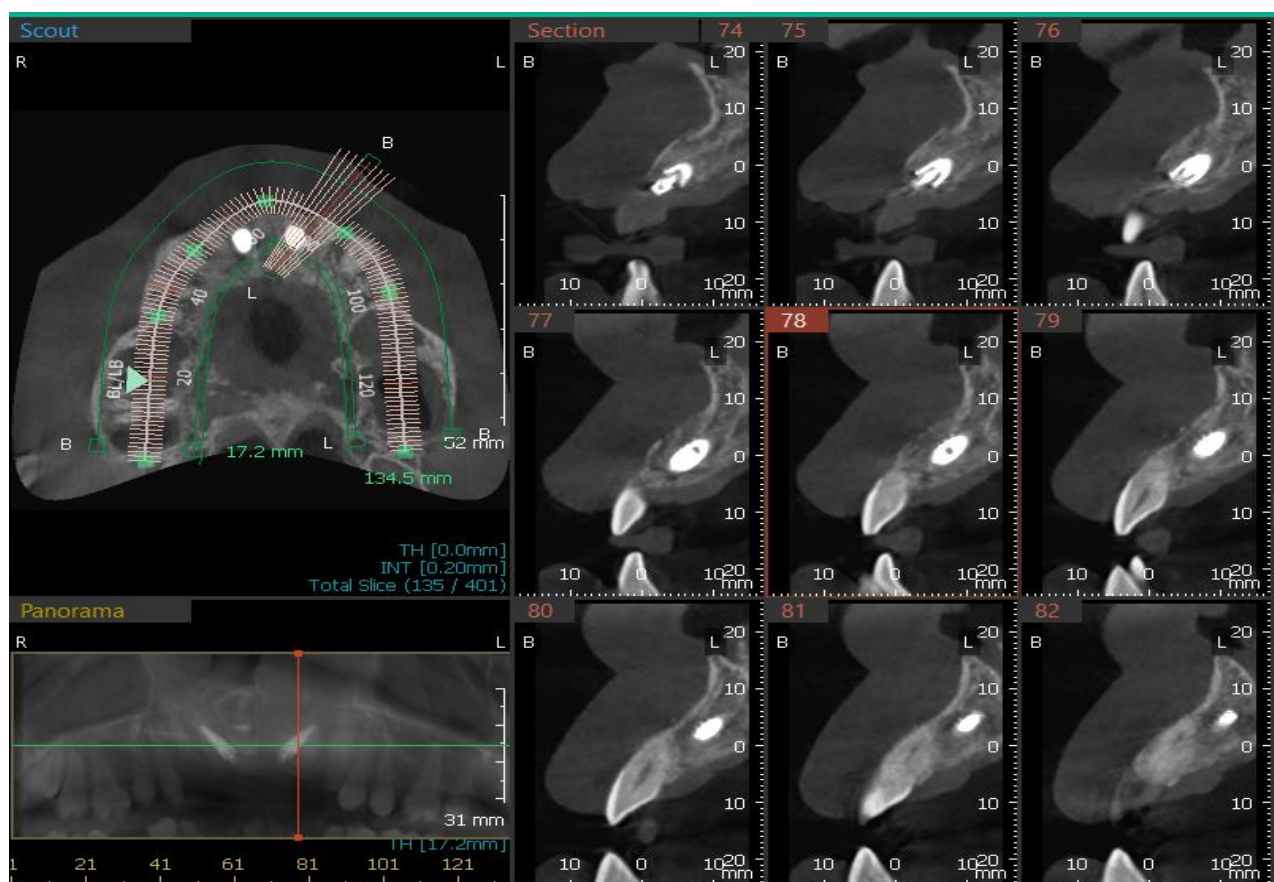


Figure 6. CBCT cross-section of the upper left central incisor implant illustrating preserved cortical boundaries, uniform bone apposition, and appropriate three-dimensional alignment at 3-month follow-up).

At the six-month follow-up, a panoramic radiograph (Figure 7) confirmed stable integration of both implants with maintained vertical positioning and no radiographic evidence of bone loss, pathology, or mechanical stress. Both implants remained clinically immobile, asymptomatic, and free of peri-implant complications.

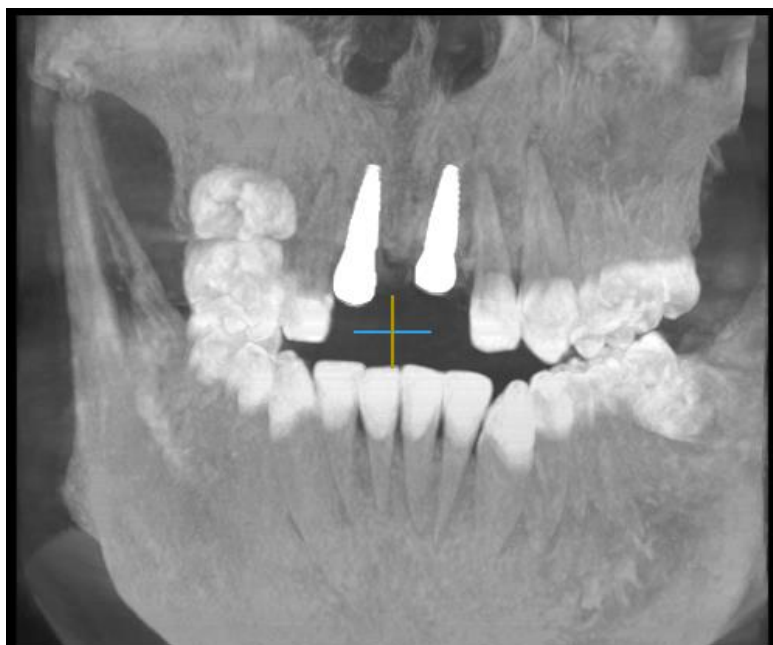


Figure 7. Panoramic radiograph demonstrating radiographically stable osseointegration of both maxillary central incisor implants with no evidence of marginal bone changes at 6-month follow-up.

The patient reported no discomfort, masticatory limitations, or prosthetic instability throughout the entire observation period. The favorable clinical and radiographic findings supported the long-term prognosis and validated the chosen immediate loading protocol (see Table 1).

Table 1. Clinical and Implant Characteristics of the Patient Undergoing Immediate Implant Placement in the Anterior Maxillary Esthetic Zone

Patient	Age (yr)	Implant data			Site	Bone quality	Complications	Final restoration (mo)	Follow-up (mo)
		Type	Diameter (mm)	Length (mm)					
Male	22	JD	3.7	13	UMC	D2	NONE	3	6

5. Discussion

This clinical case illustrates that immediate implant placement and immediate loading of multiple implants within the anterior maxillary esthetic zone can yield stable short-term outcomes when supported by sound surgical and prosthetic principles. The uneventful healing, preserved soft-tissue contours, and stable marginal bone levels observed during the six-month follow-up are consistent with current evidence demonstrating the predictability of immediate loading in well-selected cases (Chen and Buser, 2014 ; Esposito, et.al., 2010 ; Lang , et.al., 2012).

Buccal plate characteristics have been identified as critical determinants of esthetic predictability. Chappuis et al. highlighted the susceptibility of sites with a buccal plate thickness <1 mm to accelerated resorption and subsequent soft-tissue collapse.⁴ In the present case, atraumatic extraction and correct implant positioning within the bony envelope likely contributed to the maintenance of mid-facial soft-tissue architecture, aligning with Buser's recommendations for esthetic-zone implant placement (Buser, et.al., 2004 ; Kan., et.al., 2003).

Immediate provisionalization also plays an essential role in shaping peri-implant mucosa and stabilizing the labial gingival margin. Kan et al. demonstrated that immediate temporization supports favorable soft-tissue profiles when adequate primary stability is achieved.¹² Similarly, Tarnow et al. reported that immediate loading does not compromise osseointegration when occlusal forces are controlled and insertion torque is sufficient.¹⁴ In this case, the provisional restoration provided three months of guided soft-tissue maturation, contributing to the natural emergence profile noted at final prosthesis delivery.

Radiographic assessment revealed stable crestal bone levels during follow-up, consistent with systematic reviews indicating that immediate loading protocols can achieve marginal bone changes comparable to conventional healing (Zafar, et.al., 2020 ; Cheng), et.al., 2020). This stability may be attributed to prosthetically driven implant placement and the avoidance of excessive micromotion—an important biomechanical prerequisite emphasized by Brunski (Zafar, et.al., 2020 ; Brunski, 1992).

No biological or mechanical complications were observed throughout the follow-up period, which aligns with studies showing that immediate protocols can be successful even in challenging esthetic scenarios when appropriate surgical precision and prosthetic control are maintained.^{6,15} While esthetic outcomes in the anterior maxilla are known to be sensitive to soft-tissue phenotype and buccal bone morphology,⁴ the favorable peri-implant tissue behavior in this case highlights the value of atraumatic tooth extraction, precise implant angulation, and controlled provisionalization.

Overall, the clinical outcomes align with established evidence supporting immediate placement and loading as a viable treatment option for the anterior maxillary region when executed under optimal conditions.

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