

IMMEDIATE SINGLE IMPLANT PLACEMENT WITH IMMEDIATE LOADING IN THE MAXILLA

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Abstract: The primary aim of this article is to present a comprehensive clinical case report regarding immediate single-implant placement combined with an immediate loading protocol in the maxillary premolar region. This modern surgical approach was utilized to provide a rapid, high-quality aesthetic and functional solution for a patient following the sudden loss of the maxillary left first premolar. The case involved a 45-year-old healthy female patient who sought treatment after sustaining trauma-related damage to the tooth. Upon detailed intraoral examination and radiographic assessment, a non-restorable root remnant associated with tooth 24 was identified, necessitating a strategic extraction and replacement plan.

The surgical phase began with a minimally invasive, atraumatic extraction of the root remnant to ensure the maximum preservation of the surrounding alveolar bone and delicate gingival architecture. On the same day, a dental implant was successfully placed into the fresh extraction socket. To manage the residual space, known as the "jumping distance," between the implant surface and the internal walls of the socket, a bovine-derived xenograft (Bio-Oss) was meticulously packed into the gap. Notably, this was performed without the use of a barrier membrane; this specific technique was chosen to allow the periosteum to remain in direct contact with the graft, thereby maintaining its vital role in providing vascularization and essential growth factors to the site.

To meet the patient's immediate aesthetic demands and to help mold the peri-implant soft tissues, an immediate provisionalization was carried out using a custom-made PMMA temporary crown. This temporary restoration allowed for the maintenance of the emergence profile throughout the integration phase. Following an undisturbed five-month healing and osseointegration period, the digital restorative phase was initiated. A final implant-level digital scan was obtained using the high-precision CEREC Primescan system, ensuring an accurate recording of the soft tissue contours and implant position.

Subsequently, a definitive zirconia crown was fabricated and mounted on a titanium base (Ti-base) to provide long-term durability and biocompatibility. The restoration was carefully seated and occlusion was verified. This case report clearly shows highly aesthetic and functional results. Furthermore, it highlights several clinical advantages of this protocol, including the elimination of a secondary surgical site, a significantly reduced overall treatment duration, and the preservation of the natural alveolar ridge volume and gingival aesthetics.

Keywords: Immediate implant placement; Osseointegration; Xenograft; Single implant; Tooth extraction; Esthetic; Immediate loading

1. INTRODUCTION

Disease or trauma can be the reason for losing teeth, but they can also be congenitally absent. An excellent treatment option to replace missing teeth apart from dental bridges, are dental implants. There is a wide number of research and publications discussing the ideal time to place an implant after tooth extraction. What they all have in common is the interest in shortening the treatment time and subsequently a lower number of interventions.

The conventional implant protocol introduced by Brånemark (as cited in Peitsinis et al., 2025) recommended a healing period of approximately six months after tooth extraction prior to implant placement. This protocol aimed to ensure implant insertion into stable ridge dimensions; however, research shows that bone availability may be obstructed by significant resorptive changes occurring immediately after tooth extraction (Peitsinis et al., 2025).

Currently, aesthetic outcomes are considered a key factor for success, while determined by the specific time when the implant is being inserted into the bone in the anterior region. Clinicians typically choose from four treatment options defined by established consensus protocols, including immediate implant placement where implants are inserted within 0 to 7 days of extraction (Chatzopoulos et al., 2025).

According to current classification standards there are three primary early protocols (Peitsinis et al., 2025; Chatzopoulos et al., 2025). Type 1, or immediate placement, involves inserting the implant directly into the fresh extraction socket, utilizing the existing socket walls for primary stability. Type 2, referred to as early placement, is performed after a healing period of approximately 4 to 8 weeks, allowing resolution of any residual infection and improved soft tissue conditions for closure and possible augmentation procedures. Type 3, often termed early delayed or conventional placement, occurs after 12 to 16 weeks, when most post-extraction remodeling of the alveolar ridge has already taken place.

Comparative studies evaluating short-term outcomes have reported no statistically significant differences in implant survival rates at 12 months among immediate, early, and delayed placement protocols (Chatzopoulos et al., 2025). During socket healing, resorption of the alveolar walls occurs alongside new bone formation within the socket, resulting in an overall reduction in ridge volume (Araújo & Lindhe, 2025). Buccolingual resorption is particularly prevalent within the first three months following extraction. Therefore, clinicians must accurately predict, this ridge changes to determine the optimal timing for placement and soft tissue management (Araújo & Lindhe, 2025).

Based on this moder findings, we describe a clinical case suitable for rehabilitation via immediate implant placement with immediate loading of tooth 24, which was lost due to traumatic vertical fracture. This work illustrates the importance of achieving both functional and aesthetic success through prudent management of treatment timing.

2. CLINICAL CASE REPORT

A 45-year-old female patient who suffered a traumatic fracture of tooth 24, specifically seeking a quick rehabilitation with a dental implant and provisional restoration. She was in good general health with no history of smoking. Clinical intraoral examination revealed a mobile crown, that we took off before the surgical procedure, and a satisfactory periodontal status (Figure 1).

Figure1. Preoperative clinical photo



Source: Photograph taken by the author (Karakabakova, 2026)

Apart from that, the patient needed to replace some old dental fillings.

On the panoramic radiograph that was obtained before the extraction of the fractured tooth indicated a root remnant and also some inadequate endodontic filling (Figure 2)

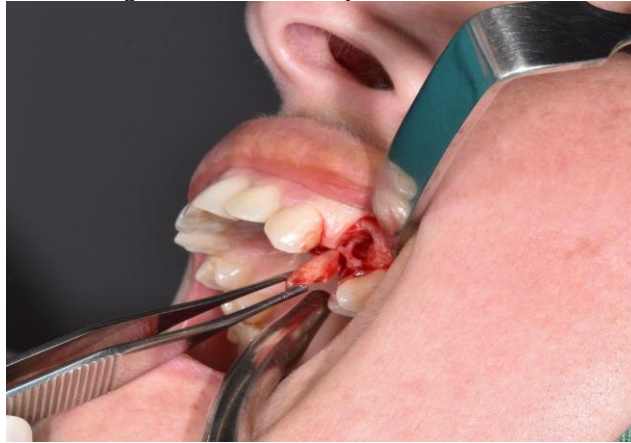
Figure 2: Preoperative radiograph



Source: Photograph taken by the author (Karakabakova, 2026)

A 3D CBCT was also done to check the available quantity and quality of the bone needed for implant placement. After careful oral examination and elimination of local irritative factors, surgical treatment was initiated. The following surgical procedure was done under local anesthesia using 4% articaine with epinephrine (Artinibsa, Inibsa). The flap was designed conservatively to keep the papilla intact and elevated in full thickness. After atraumatic root extraction, the implant placement was performed using Roott Implant (Rootform, Switzerland) with a type 1 implant placement (immediate implant placement during the same surgical visit as the tooth extraction, 0 weeks healing) (Figure 3).

Figure 3. Extraction of the root remnant

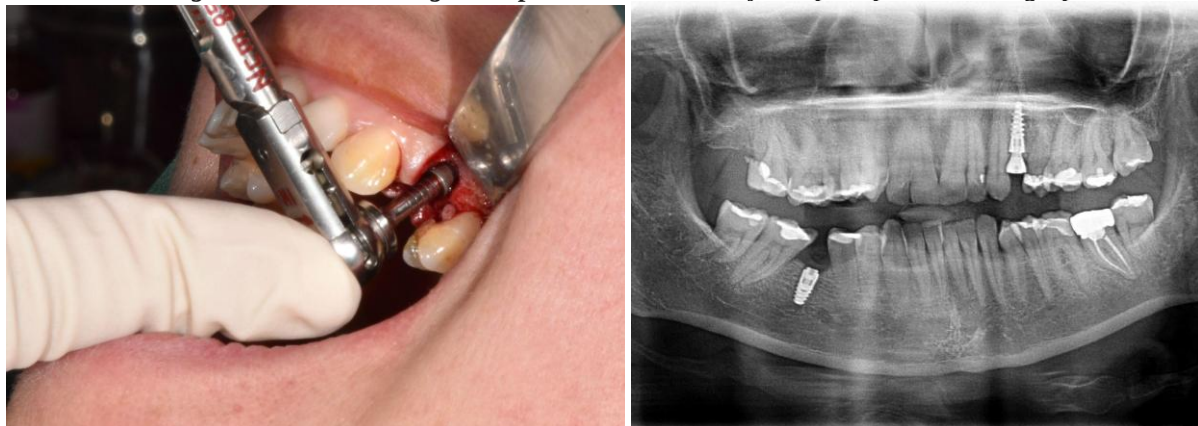


Source: Photograph taken by the author (Karakabakova, 2026)

Immediately prior to surgery, the patient rinsed with 0.20% chlorhexidine solution (Curaprox Perio Plus+ Forte, Switzerland) for two minutes. The implant was placed freehand estimating the correct position using the 3D CBCT, surrounding teeth and bone thickness and density. The osteotomy preparation was executed to accommodate an implant of 42x12mm dimension. While reaching the final position also a torque of 45Ncm was achieved, securing primary stability.

The implant was positioned 3 mm sub crestal to the palatal cortical plate at the extraction site (Figure 4a, b).

Figure 4a and b: Placing the implant in the osteotomy and postoperative radiograph



Source: Photograph taken by the author (Karakabakova, 2026)

A xenograft material (Cerabone®, botiss biomaterials/Straumann) was used to fill the space between the implant surface and the residual extraction socket, keeping the crestal initial architecture. Current literature supports the role of xenogeneic grafts in reducing dimensional alterations of the alveolar ridge following extraction (Araújo & Lindhe, 2025).

The wound was closed with simple sutures (absorbable, Optime, Peters Surgical), and a gingiva former was placed until an intraoral scanning was performed in order to produce the temporary PMMA crown which was done later the same day. Postoperatively, the patient was placed on amoxicillin at a daily dose of 2 g and advised rinsing with

0.20% chlorhexidine digluconate three times a day for two weeks. This postoperative approach is consistent with current clinical standards for immediately loaded implants (Peitsinis et al., 2025). Healing progressed without complications, and the patient reported no discomfort or adverse clinical findings.

3. RESULTS

After the healing period of 5 months passed, the temporary crown was removed, and the newly formed emergence profile was revealed (Figure 5).

Figure 5: temporary PMMA crown after 5 months of healing and emergence profile



Source: Photograph taken by the author (Karakabakova, 2026)

Clinical examination revealed clinically healthy and aesthetically pleasing soft tissue around the implant with no signs of complication. Using an implant level scan body, we took a new intraoral scan in order to manufacture the final Ti-base screw retained zirconia crown.

The clinical check at the delivery of the final crown shows the appearance of a beautiful esthetic outcome and good quality of peri- implant soft tissue (Figure 6).

Figure 6. delivery of the final Ti-base zirconia crown



Source: Photograph taken by the author (Karakabakova, 2026)

4. DISCUSSION

Choosing the surgical approach and the loading protocol is the key in planning the implant therapy. Historically, implants were placed only after extraction sites were completely healed, primarily in edentulous patients. This traditional method was often associated with prolonged treatment times, making it less accepted by both clinicians and patients. In addition, post-extraction remodeling of the alveolar bone frequently compromised esthetic outcomes, particularly in visible regions (Buser et al., 2017).

To standardize treatment timing, the International Team for Implantology introduced classifications outlining different implant placement protocols. These include immediate placement at the time of extraction, early placement

following soft tissue healing (approximately 4–8 weeks), early placement with partial bone healing (12–16 weeks), and delayed placement performed after 6 months (Peitsinis et al., 2025).

Evidence shows that, in single-tooth gaps in the anterior maxilla, both immediate and early implant placement leads to similar outcomes in terms of ridge stability, esthetics and patient satisfaction level. Immediate loading protocols—defined as prosthetic restoration within 48 to 72 hours after implant placement—have also been often researched (Hadilou et al., 2021; Shafiee et al., 2025). Current data indicate that implant survival rates and marginal bone loss are not affected a lot by whether loading is immediate or early, even at follow-up periods over a yearlong (Chatzopoulos et al., 2025). From a patient point of view, shorter rehabilitation time remains a top priority.

The application of xenograft material was done to fill the buccal gap and minimize vertical resorption of the buccal plate (Araújo & Lindhe, 2025). In this case, the gap was managed using xenograft material without the use of a barrier membrane. This approach shows lower surgical complexity and cost while keeping the biological contribution of the periosteum. Keeping the periosteum intact is important, as it contains mesenchymal stem cells, helps the angiogenesis and the release of growth factors for bone healing and remodeling (Cheng et al., 2025).

Overall, the case resulted in the expected favorable functional and esthetic outcomes, highlighting the benefits of early implant placement following soft tissue healing. Achieving optimal esthetics requires careful consideration of both intraoral and extraoral anatomical factors (Rijal et al., 2021; Rijal et al., 2022).

5. CONCLUSION

Immediate implant placement in extraction sockets is a predictable procedure with favorable results. Immediate placement provides a massive benefit for patients as it is abolishing the need for second surgery and significantly reduces overall treatment time. With immediate implant placement, patients can receive their new restoration four months after extraction, compared to the eight-month waiting period with two or more surgeries (Ibrahim, A. et al. 2021)

ETHICAL APPROVAL

For this case report we have a written consent from the patient to publish the case and photos.

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