



Immediate Implant Placement In The Esthetic Zone Using A Flapless Approach: A Case Report With 12 Months Follow-Up*

Estetik Bölgede Flepsiz Yaklaşım ile İmmediat İmplant Yerleşimi: 12 Ay Takipli Bir Olgu Sunumu

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Abstract: The rehabilitation of missing maxillary anterior teeth is one of the most challenging procedures in modern dentistry. Providing hard and soft tissue stability is critical to achieving long-term implant success. Immediate implant placement in a fresh extraction socket with the flapless technique allows maintenance of both soft and hard tissues, reducing postoperative complications, shortening the overall treatment time, faster recovery and improving patient comfort. In this report, a clinical case of single anterior tooth restoration using an immediate implant placement procedure with a flapless surgical approach is presented. No clinical or radiological problems were encountered around the dental implant during the 12-month observation period and the patient was esthetically satisfied. In the light of the results of numerous studies in this field and of this case report, it may be concluded that immediate implant placement with flapless technique may contribute to the improvement of the final esthetic results and increase patient satisfaction.

Keywords: Dental implant, Esthetics, Immediate, Single-tooth.

Öz: Maksiller anterior diş kaybının rehabilitasyonu modern diş hekimliğindeki en zorlu prosedürlerden biridir. İmplantların uzun süreli başarısı için sert ve yumuşak doku stabilitesinin sağlanması esastır. Flepsiz teknik ile taze çekim soketine imediat implant yerleşimi sert ve yumuşak dokuların korunmasına, postoperatif komplikasyonların azalmasına, genel tedavi süresinin kısalmasına, daha hızlı iyileşmeye ve hasta konforunun artmasına imkan sağlar. Bu vaka raporunda, flepsiz cerrahi yaklaşım ile birlikte imediat implant yerleştirme protokolünün kullanıldığı anterior tek diş restorasyonu uygulanan klinik bir olgu sunulmuştur. On iki aylık gözlem süresi boyunca dental implant çevresinde herhangi bir klinik veya radyolojik sorunla karşılaşılma ve hasta estetik açıdan memnundu. Bu alanda yapılan çok sayıda çalışmanın ve bu vaka raporunun sonuçları ışığında, flepsiz cerrahi yaklaşım ile imediat implant yerleştirilmesinin nihai estetik sonuçların iyileştirilmesine katkı sağlayabileceği ve hasta memnuniyetini arttırabileceği sonucuna varılabilir.

Anahtar kelimeler: Acil, Dental implant yerleştirme, Dental estetik, Tek-diş implantlar

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Introduction

In contemporary dentistry, the expectations and esthetic requests of patients are increasing day by day. It is much more difficult to meet these expectations, especially in the anterior esthetic zone. Since anterior tooth loss has a negative effect on function, esthetics, and consequently quality of life, patients demand short treatment protocols (Esposito, Grusovin, Polyzos, Felice and Worthington, 2010; Gotfredsen and Walls, 2007).

The traditional implant protocol suggests placing the implants several months after tooth extraction to ensure complete bone healing (Brånemark, Adell, Albrektsson, Lekholm, Lundkvist and Rockler, 1983). This procedure resulted in some disadvantages, such as longer treatment time, increased surgical interventions, and patient discomfort. Type 1 (immediate) implant placement method, which is the protocol of placing implants immediately upon tooth extraction, was proposed as an alternative to standard implant treatment to overcome these drawbacks (Koh, Rudek and Wang, 2010). Type I implant placement protocol have demonstrated a survival rate comparable to conventional procedure (Cakarer et al., 2014; Esposito et al., 2010; Lang, Pun, Lau, Li and Wong, 2012). Furthermore, immediate implant placement may prevent alveolar bone resorption and soft tissue loss, thus contribute to optimal esthetics (Jofre, Valenzuela, Quintana and Asenjo-Lobos, 2012). However, surgical approach (flapped or flapless surgery), additional surgery (bone augmentation, soft tissue grafting etc.), implant position, implant type, and prosthetic design may affect the final esthetic outcomes (Groenendijk, Staas, Bronkhorst, Raghoobar and Meijer, 2020).

Recent studies have reported that the recession of the marginal peri-implant mucosa and consequently unpredictable esthetic outcomes may be encountered in type I implant placement in the esthetic region (Lindeboom, Tjiook and Kroon, 2006; Norton, 2004). In particular, resorption of the facial socket wall was associated with facial marginal gingival recession (Araújo and Lindhe, 2005). It has been suggested that raising a surgical flap may contribute to this result by causing disruption of the blood supply of the facial bone (Araújo, Sukekava, Wennström and Lindhe, 2005). Therefore, flapless surgical procedures have been recommended for immediate implantation in order to reduce the amount of marginal mucosal recession and improve esthetic results (Blanco, Nuñez, Aracil, Muñoz and Ramos, 2008). In clinical studies, it has been reported that the flapless procedure prevents marginal bone loss (Becker, Goldstein, Becker and Sennerby, 2005) and had significantly less marginal mucosal recession than the open flap procedure in immediate implant placement (Raes, Cosyn,

Crommelinck, Coessens and De Bruyn, 2011). In addition, flapless surgery could support the preservation of the peri-implant papilla and obtaining ideal esthetic results in the esthetic zone (Hämmerle, Araújo and Simion, 2012).

The following clinical report illustrates the replacement of a missing tooth in the anterior maxillary region with immediate implant placement using the flapless approach.

Case Report

A 22-year-old, systemically healthy and non-smoker female patient presented complaining of dull pain and discoloration of her maxillary left central incisor (Figure 1A). Clinical examination revealed pain on vertical percussion. The radiographic appearance indicated nonhealing periapical lesion and external root resorption associated with failed endodontic therapy (Figure 1B). After evaluation of local and systemic factors and patient expectations, extraction of the hopeless tooth and replacement with a dental implant was determined as the most appropriate treatment option for the patient.

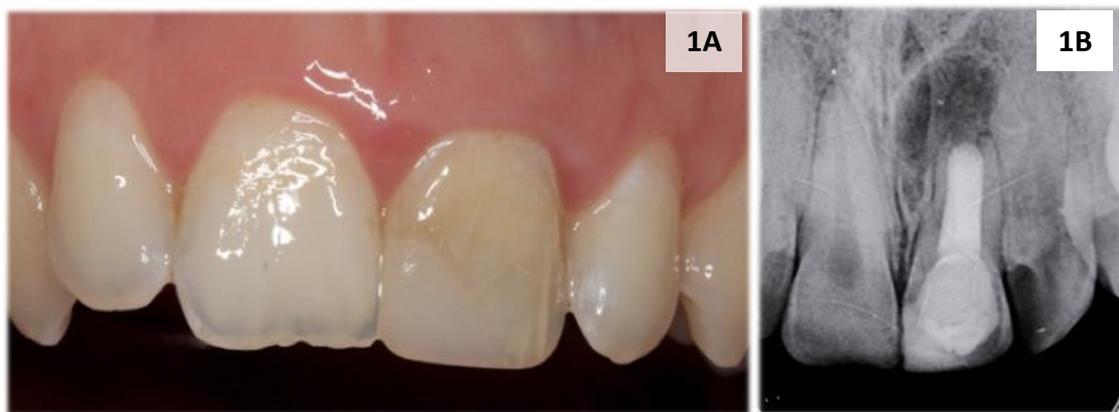


Figure 1: Initial clinical (A) and radiological (B) appearance

A minimally traumatic extraction of the tooth was performed without flap elevation. The extraction socket was debrided with surgical curettes to remove granulation tissue (Figure 2A). Then the socket walls were inspected for the presence of fenestration or dehiscence defects and no defect was determined. The site preparation was performed along the palatal socket wall according to the instructions of the manufacturer. This was followed by the placement of an implant immediately (Figure 2B). The gap between the implant and the inner aspect of the buccal socket wall was filled with particulated bone graft, and the socket was covered with a free gingival graft harvested from the palate (Figure 2C). Antibiotics (amoxicillin/clavulanic

acid 875 mg/125 mg 2 times daily for 7 days), anti-inflammatory medication (dexketoprofen 25 mg 3 times daily for 4 days) and chlorhexidine mouthwash (2 times daily for 7 days) were prescribed. After a healing period of 2 weeks, the sutures were removed and the extracted tooth pontic was splinted to the adjacent teeth with fiber-reinforced composite (Figure 2D). Repeat appointments were made once a month. Prosthetic procedures were started at the 5th month. After the crestal incision was placed and the cover screw was removed, the healing cap was inserted and the patient was referred to the Prosthetic Dentistry Department for further prosthetic rehabilitation. After the permanent prosthesis was placed, the patient was recalled every month. During the 12-month follow-up period, no clinical or radiological problems were observed around the dental implant (Figure. 3).

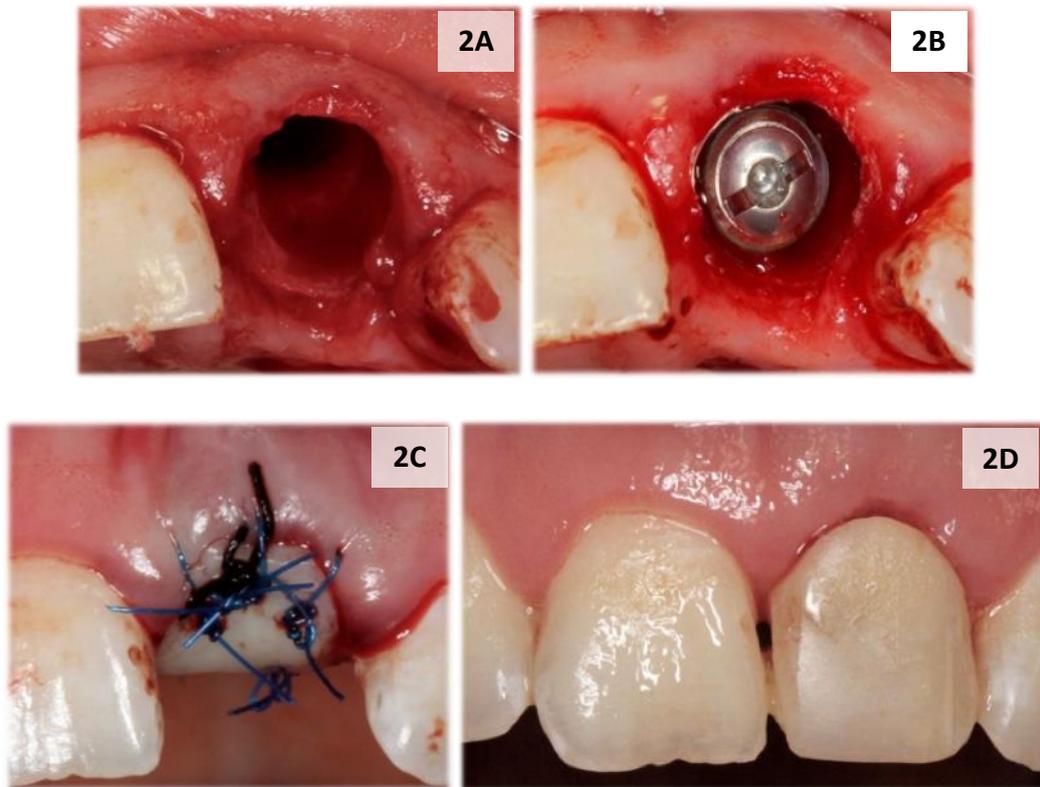


Figure 2: Surgical procedure steps (A-C), splinting of extracted tooth (D)

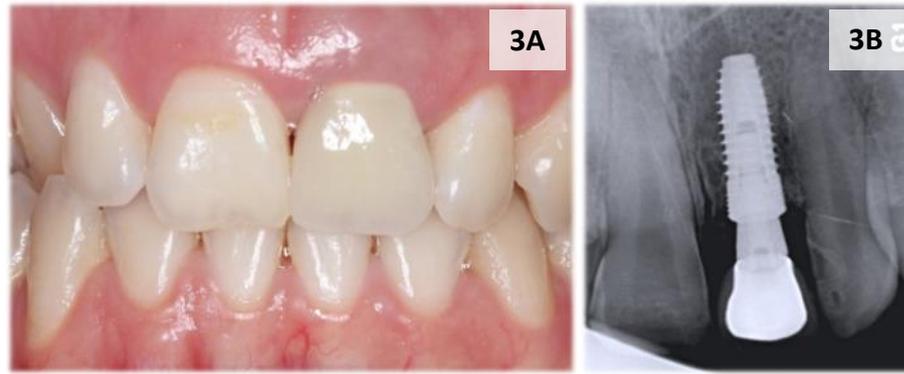


Figure 3: 12th month clinical (A) and radiological (B) view

Discussion

Type I implant protocol has been an attractive treatment option for patients as well as for practitioners. This procedure is recommended to preserve soft tissue profile and bone dimensions, minimize the edentulous period, and optimize esthetic outcomes (Becker, Becker, Ricci and Geurs, 1998; Kan, Rungcharassaeng and Lozada, 2003; Lazzara, 1989).

In a recent systematic review (Slagter, den Hartog, Bakker, Vissink, Meijer and Raghoobar, 2014), the 1-year survival rate of immediately placed single-tooth implants in the esthetic zone was reported to be 97.1%. On the other hand, Cosyn, De Lat, Seyssens, Doornewaard, Deschepper and Vervaeke (2019) showed that immediate implant placement had a higher risk than delayed procedure for early implant failure due to a lack of osseointegration. However, it would be more appropriate to evaluate the success of the implant as the functioning of the implant without any biological, technical, or esthetic complications rather than the survival of the implant. Rodrigo, Martin and Sanz (2012) evaluated immediate implants and delayed implants in the same patients with a 5-year follow-up, and reported that both methods had similar clinical features, but the implants placed with the immediate protocol showed a higher tendency to crestal bone loss and peri-implantitis. However, it was demonstrated that the mean radiological bone level was maintained and even improved during the 5-year follow-up in immediate implants. Lang, Pun, Lau, Li and Wong (2012) revealed that marginal bone loss occurs predominantly in the first year after implant placement and is usually less than 1 mm. In the present case, the end of 1-year observation period, the immediately placed implant survived without any clinical and radiological problems.

Although type I implant placement is recommended as a reliable method, undesirable esthetic outcomes may be encountered in association with buccal bone resorption. (Araújo et

al., 2005; Blanco et al., 2008). In a systematic review (Lang et al., 2012), it has been concluded that the major alterations in soft tissues occurred in the first 6 months following immediate implant placement. Five-year prospective studies have shown that type I implant protocol has a higher risk for midfacial recession, with prevalence of advanced midfacial recession (>1 mm) up to 21% (Cooper et al., 2014; Cosyn, Eghbali, Hermans, Vervaeke, De Bruyn and Cleymaet, 2016). On the other hand, Cosyn, Hooghe and De Bruyn (2012) reported a low risk ($<10\%$) for advanced midfacial recession (≥ 1 mm) in the presence of intact buccal bone wall and thick gingival biotype in immediate implant treatment with a flapless approach.

Flapless implant surgery has many superiorities over the conventional flap method, such as minimized crestal bone loss, minimal bleeding, less patient discomfort, and shorter surgery and recovery time (Becker, Goldstein, Becker, Sennerby, Kois and Hujuel, 2009). Vascular disruption and an acute inflammatory response caused by separation of the periosteum from the underlying bone surface in the flapped procedure may contribute to bone resorption in the surgical area (Wood, Hoag, Donnenfeld and Rosenfeld, 1972). In an animal study conducted by Blanco et al. (2008) it was reported that less bone resorption was observed after immediate implant placement without raising a flap, compared to with reflection of a flap, but this difference was not statistically significant. A case series study (Raes et al., 2011) reported significantly less midfacial recession for immediate implants placed with a flapless approach on average after 1 year. However, there are mechanical and biological elements that need to be evaluated when deciding whether the case is suitable for flapless technique. Presence of a thick gingival biotype, a sufficient amount of keratinised soft tissue (i.e., a minimum of 6 mm in width), a low smile line, and the square-shaped teeth contribute to the predictability of the final esthetic results (Jesch, Jesch, Bruckmoser, Krebs, Kladek and Seemann, 2018; Kois, 2004; Maló, de Araújo Nobre and Lopes, 2016). In the present case, in order to improve esthetic results and increase patient satisfaction, immediate implant placement was combined with flapless surgery. The presence of a thick gingival biotype, square-shaped teeth, and an intact buccal wall also supported the preference of the flapless approach in this case. During the 12-month evaluation period, no peri-implant mucosal recession was observed. Peri-implant soft tissues were in harmony with the adjacent teeth and the final esthetic results were acceptable for both the patient and the clinician.

Conclusion

Immediate implant placement procedure with flapless technique might be a favourable treatment option for anterior single tooth replacement. However, this is a complex and challenging technique and requires strict case selection and experienced clinicians.

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