



## Comparison Success Rate of Immediate Implants at Fresh Extraction Sockets and Conventional Implants

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### Abstract

**Objective:** The aim of this presented study was to evaluate the survival and success rates implants with immediate and conventional placement. The second aim of this study was to evaluate and compared the crestal bone and gingival margin level around the implants in each groups.

**Material and methods:** 30 immediate implants in 26 patients (test group) and 34 conventional implants in 26 patients (control group) were evaluated. All implants at least 12 months follow-up. The change in the level of crestal bone was measured on standardized digital panoramic radiograph and gingival margin recession values were evaluated in clinically, third months, and twelfth months for each patient. The measurements were statistically analyzed.

**Results:** Sixty-four implants healed without complication. Implants and restorations had a 100% survival rate during the study. Mean marginal bone resorption was calculated at  $0.7 \pm 0.5$  mm for test group and  $0.6 \pm 0.6$  for control group after at least 1 year in function. Both initially and after 12 months, gingival recession values were found similar for each group ( $p \leq 0.05$ ).

**Conclusions:** The results of this study demonstrated that the implant may be placed 2 mm below the crestal bone level to compensate the crestal bone loss. Immediate implant placement techniques are effective procedures as conventional implant placement.

### Keywords

Immediate implant placement, Implants survivor rates, Gingival recession, Marginal bone level

### Introduction

Immediate implant placement has gained popularity because it can reduce treatment time, number of surgeries and post-extraction bone loss [1,2]. Following tooth extraction, socket area shows series of physiologic processes, during the recovery time that passes between tooth extraction and the placement of the implant, the majority of the amount of bone resorption and gingival remodeling is confirmed, which is usually the cause of biological, aesthetic and functional damage [3]. Because of these factors, the technique for placement of implants immediately and early immediately after extraction was proposed as a way of maintaining the osseous complex of the surgical area [2,3]. Immediate implant placement refers to the placement of an implant into a tooth socket concurrently with the extraction [2-

4]. Modeling of the alveolar ridge after extraction continues to occur following the implant placement [5,6].

The aim of this study was to evaluate the survival and success rates implants with immediate and conventional placement. The second aim of this study was to evaluate and compared the crestal bone and gingival margin level around the implants in each groups.

### Material and Methods

#### Patient selection

The clinical and radiographical outcomes evaluated of 26 patients (16 male, 10 female) who treated at the department of Periodontology, School of Dentistry, University of Necmettin Erbakan Konya, Turkey with two or more adjacent or contralateral missing premolar and molar teeth were screened for eligibility to participate in this retrospective study. This retrospective study protocol was approved by the Ethics Committee of the Necmettin Erbakan University. 30 immediate implants in 26 patients (test group) and 34 conventional implants in 26 patients (control group) were evaluated. All implants at least 12 months follow-up. Additional surgery requirement, complications, advantages and disadvantages of immediate and conventional implant placement were compared. Patients record screened retrospectively who did not have any systemic health problem and did not need sinus floor augmentation, distraction osteogenesis and bone grafting had at least 2 adjacent premolar or molar teeth in the mandibula and maxilla. After extracted teeth and surgical preparation of sockets, implants placement immediately in test group. The other implants were placed conventionally in control group. All implants were evaluated in clinically and radiographically every twelfth months. All treatment steps were part of the routine procedures at the clinic, and no extra measures were made for this study.

#### Surgery procedure

Surgical procedures were performed by the same surgeon (E. Ö.). The surgical operations were carried out with local infiltration anesthesia (Ultracaine D-S, Hoechst A.G, Turkey). After a crestal incision, a mucoperiosteal flap was elevated. Remaining teeth were carefully luxated with periostomes and teeth pulled out. Sockets were cleaned from granulation tissue and rinsed with saline. Implant sites were prepared in extraction sites, the implants were submerged 2 mm below the margins of the socket. The

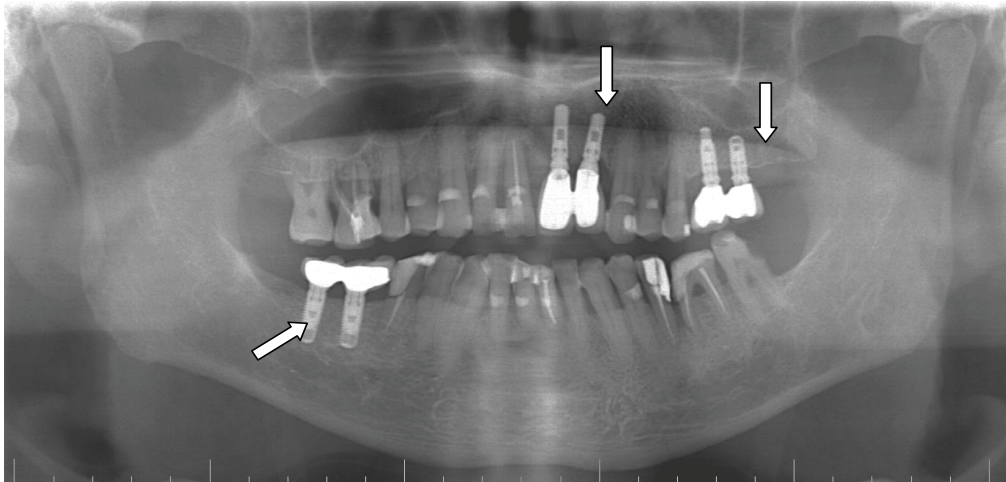


Figure 1: White arrows indicate the conventional implants.

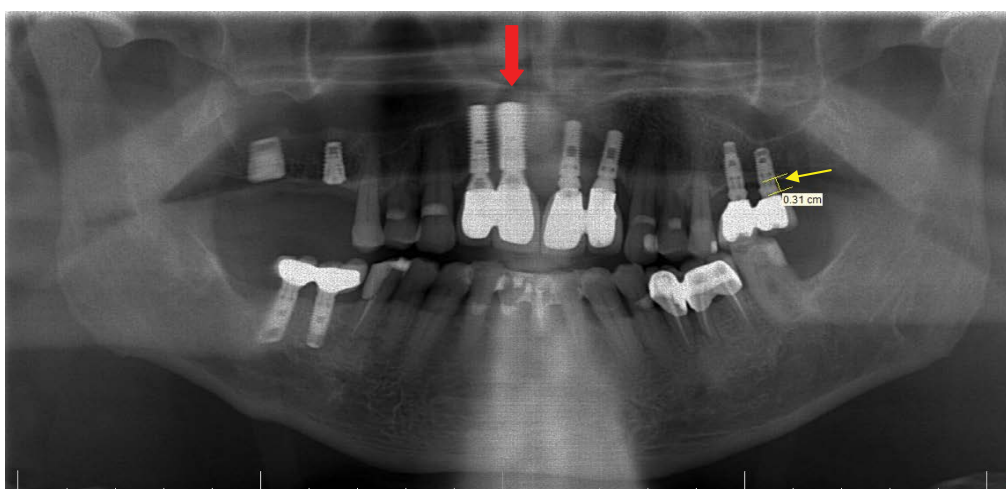


Figure 2: Red arrows shows that immediate implants, white arrows indicate the conventional implants. Yellow arrows indicate the measurement points.

control groups implants were placed in the edentulous space as conventional. Mucoperiosteal flaps were brought to the original position, healing caps were not covered and flaps were sutured with 4/0 vicryl sutures. After the 7 days sutures were removed. Patients, the operation would lead to disruption in their daily lives in a subsequent period, and any discomfort or pain with the reported. They received their prescribed drugs regularly. Developed complications were not observed during the recovery period. Healing caps were placed in 3<sup>rd</sup> months.

#### Evaluation and criteria of success

All implants were evaluated at 12 months after placement. During clinical recalls at 3 months, and 12 months changes in gingival margins were recorded with in millimeters by Williams Probe (Hu Friedy, Chicago, IL, USA) and bone loss evaluated in standard digital panoramic radiography (Figure 1). As part of the general routines, patients were enrolled in an individually designed maintenance care program for professional cleaning and examinations if needed. The change in the level of crestal marginal bone level was measured on standardized digital panoramic radiograph (Figure 2). All panoramic images were taken using the same panoramic machine (Eastman Kodak 8000; Rochester, NY) by the same technician, according to the manufacturer's reference guide. All images were recorded as JPEG files.

The upper corner of the coronal shoulder of the implant was used as reference point, and measurements from the reference point to the first bone contact of the implant were performed using a PC. An implant was accepted successful when (1) no sign of failure seemed in panoramic

and periapical radiography, (2) no pain or symptoms of infection were present, (3)  $\geq 2$  mm bone loss, (4) gingival margin recession.

#### Statistical analysis

Statistical computations were carried out using IBM PASW/SPSS software (v.18.0.0 2009, IBM Corporation, Somers, NY, USA). Implants were included in the statistical analysis as independent values. Mean values and standard deviations were calculated for each variable and group. The difference between groups was analyzed with ANOVA and the difference within groups was analyzed with Student t-test.

#### Results

The study population consisted of 26 patients (16 male and 10 female) mean age  $40.2 \pm 11.5$ . Sixty-four implants healed without complication. Implants and restorations had a 100% survival rate during the study. The marginal bone level was positioned mean  $0.5 \pm 0.5$  mm (range 0 to 2.1 mm) below the reference point at baseline for each group and  $1.2 \pm 0.6$  mm after at least 1 year in function in test group and  $1.1 \pm 0.5$  in control group. Mean marginal bone resorption was calculated at  $0.7 \pm 0.5$  mm for test group and  $0.6 \pm 0.6$  for control group after at least 1 year in function. Initially and ultimately measured values were not significantly different between groups ( $p \leq 0.05$ ) (Table 1).

The mean gingival margin recession were 0.22 mm at the time of prosthesis in control group and 0.20 mm in test group, 0.51 mm at 12 months in control group and 0.49 mm in test group. Both initially

**Table 1:** Statistical analysis between groups.

Groups	Immediate implants (n = 30) mm	Conventional implants (n = 34) mm	p-value
Marginal bone level (baseline)	0.5 ± 0.5	0.5 ± 0.5	P > 0.05
Marginal bone resorption (after 1 year)	0.7 ± 0.5	0.6 ± 0.6	P > 0.05
Groups	Immediate implants (n = 30) mm	Conventional implants (n = 34) mm	p-value
Gingival margin recession level (baseline)	0.20	0.22	P > 0.05
Gingival margin recession level (after 1 year)	0.49	0.51	P > 0.05

and after 12 months, gingival recession values were found similar for each group ( $p \leq 0.05$ ) (Table 1).

## Discussion

Immediate implant placement at fresh extraction sockets has become a common surgical protocol in clinical practice. This concept asserted reduced exposure of patients to surgery, limited physiological bone resorption and better gingival aesthetics outcomes [7,8]. Physiological dimensional changes occur in the alveolar ridge after tooth extraction and these changes usually occur within the first 3 months of socket healing [8-10]. These dimensional changes in the alveolar ridge may be prevented by placing immediate implant at fresh extraction sockets [9-11].

Survival rates, reported in the literature as the average results of immediate implant protocols 2-year survival rate of 98.4%, 4-year implant-survival rate decreased to 97.5% in our study 1.5 year survival rate found 100% [12]. The dimensional changes occurring in alveolar crestal bone after tooth extraction and immediate implant placement have been evaluated in several clinical studies [8-18]. In a similar experimental study the vertical dimensional changes of the buccal bone wall were  $2.1 \pm 0.4$  mm apical to the fixed landmark, after 12 weeks of healing and at the lingual wall, only minor changes were also observed [19]. Boticelli *et al.* have reported that 3.14 mm vertical bone resorption in their study after 4 months later after placing immediate implants [20,21]. In a smaller study, Blanco *et al.* 3 months later, they found 1.33 mm bone resorption [21]. In our study, the mean marginal bone resorption was calculated at  $0.7 \pm 0.5$  mm for test group after at least 1 year in function. The results of this study was similar to other studies. In this retrospective study, the buccal and lingual areas were not separately evaluated. In this study all immediate implants were placed 2 mm below the crestal bone level. May be this method provided to compensate the crestal bone loss. Chen *et al.* evaluated the changes in the buccal gingiva recession retrospectively in immediately placed implant-supported restorations, with a mean follow-up of 18 months, reporting the occurrence of marginal tissue recession ( $\geq 1$  mm) in one-third of the sites (33.3%) [22]. They reported that, the position of the implant shoulder in relation to the buccal bone plate was significantly associated with the occurrence of marginal recession. According to other similar study, gingival recessions were found  $1.8 \pm 0.83$  mm in the buccally placed implants compared with only  $0.6 \pm 0.55$  mm in those inserted lingually [10]. In this study it was found that the implants placed lingually. The mean gingival margin recession were found 0.51 mm in control group and 0.49 mm in test group at 18 months. This result similar with Kan *et al.* who reported that mean facial mucosal recession of 0.55 mm at the end of 1 year [23].

## Conclusion

Similar survival rates were observed for immediate and conventional placement, the present study indicated that immediate implant placement techniques are effective procedures as conventional implant placement. The implant may be placed 2 mm below the crestal bone level to compensate the crestal bone loss.

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