



Assessment of Alteration in Crestal Bone with Delayed and Immediate Implant Placement

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Abstract

The implant procedure is one of the most efficient and frequently accepted ways to replace missing teeth. The study was done to evaluate crestal bone changes caused by delayed and immediate implant placement. In total, 24 implant sites in patients between the ages of 25 and 55, including both male and female visitors to the Out-patient Department of Prosthodontics and Oral Implantology, were the subject of a comparative study. Clinical parameters were noted for pain, mobility, and radiographic examination of changes in crestal bone level at baseline, three months, and six months. Samples were equally divided into 2 groups: Group I with a delayed implant and Group II with a placement that was immediate. There was no statistically significant difference between Group I and Group II when the mean variation of the pain and mobility was compared between the two groups. When crestal bone alterations were compared between groups, the mean difference revealed that Group I experienced slightly more bone loss than Group II over the course of three to six months. Within the constraints of this study, it can be said that Group I (delayed implantation) experienced considerable crestal bone loss at both the mesial and distal surface from baseline to the sixth month of monitoring.

Keywords: Crestal bone loss, dental implant, osseointegration

Full-length article

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1. Introduction

The implant procedure is currently one of the most effective and commonly recognized methods of replacing missing teeth. [1]. Conventional placement of dental implant involves extraction of offending tooth, 2-4 months waiting for extraction socket to heal, insertion of dental implant and again 3-6 months waiting for integration of dental implant with surrounding bone. Because of these limitations related to conventional placement of dental implant, policies related to conventional placement of dental implant, policies related to conventional placement of dental implant, policies related to conventional placement of dental implant were introduced to considerably cut down the entire treatment by placement of dental implant immediately after extraction of tooth [2].

Alveolar ridge resorption or collapse occurs as a result of tooth extraction. Alveolar bone preservation may be aided by the placement of implants at the time of extraction [3]. One of the most important factors in the effectiveness of postoperative implants is crestal bone resorption [1,4]. Flapless procedures, immediate implant insertion, and quick loading are just a few of the advancements in implant treatment that have streamlined and shortened the treatment process. Immediate dental implant implantation has a number of benefits, including fewer surgical procedures and shorter intervals between tooth excision and replacement of the final prosthetic

restoration [2]. Early implant loading promotes the development of interproximal papillae, aids in maintaining gingival margin levels, and helps patients reach the proper clinical crown height and width [5]. The current research was done to assess an alteration in crestal bone with delayed and immediate implant placement with clinic radiographic evaluation.

2. Materials and method

2.1. Study design

The current research was conducted in Prosthodontics and oral implantology department after obtaining the approval from institutional ethic committee and consent from all the participants. The study was done after considering the inclusion and exclusion criteria. The procedure was done by single trained investigator. Inclusion criteria was; Patient in age group of 25-55 years, with good oral hygiene, good systemic health, absence of parafunctional habits, absence of systemic conditions and tooth indicated for extraction in anterior and posterior area. In this comparative study total 24 implant were placed in Group I (delayed implant placement and Group II- with immediate implant placement with 12 implants in each group. After presurgical evaluation the implant placement was done with aseptic procedure a per the guidelines.

2.2. Methodology

After obtaining profound anesthesia, the mucoperiosteal flap was lifted in the delayed group (Group I) by making a crestal incision that was about 2-3 mm towards the lingual side and extending to the sulcus of neighboring teeth by making an intrasulcular incision. The midcrestal region won't develop scar tissue thanks to this incision. In the Immediate group (Group II), a full-thickness flap was elevated and stretched past the predicted apical extension of the preplanned implant length after local anesthesia had been administered. The tooth in question was then removed with little damage to the surrounding soft tissues and bone. The socket was extensively degranulated with curettes after extraction.

Once the location had been marked, a pilot drill was used to roughly create the osteotomy site for the implant insertion. Once desired depth was confirmed, and after confirmation of depth and angulation, the osteotomy site was prepared with Tri-Spade (twist) drills to create the desired osteotomy width. Using an implant depth probe, the depth of the implant osteotomy site was determined. The prepared location was then filled with the implants. After stabilizing the flap with short, interrupted sutures, the incision was then primarily closed. The patients in both groups were recalled after seven days for the removal of suture. The patient was then recalled after third, and sixth month for recording the clinical and radiographic parameters. Pain was assessed using VAS scale. Implant mobility was assessed clinically and graded according to clinical implant mobility scale. CBCT was taken and assessed preoperatively and after six months (at baseline and 6 months) for assessment of crestal bone levels (CBL).

2.3. Statistical analysis

The obtained data was statistically evaluated using SPSS statistical software version 20.0 using independent t test.

3. Result and discussion

When comparing Group, I and Group II, the mean difference in pain and mobility (Tables 1 and 2) revealed that there was no significant difference. When comparing the two groups, the mean difference in crestal bone alterations (Table 3) revealed that Group I experienced marginally more bone loss during the three to six-month period than Group II, although that difference was not statistically significant at baseline. In the majority of cases, both posteriorly, implants have been suggested to be the best choice for single-tooth replacement [6]. The dimensions of the bone that are available for implant placement following socket healing are observed to be diminished as a result of the loss of the buccal/facial cortical plate after extraction [7].

The immediate implant is intended to stop bone loss after extraction. The height and width of the ridge are preserved using this technique [8]. The long-term prognosis of implant-supported restoration has been shown to be significantly impacted by crestal bone loss [9]. The present study evaluated the clinical and radiographic bone healing around the immediate and delayed implant placement. We found that crestal bone loss was lesser with immediate placement compared to delayed implant group.

Table 1: Intergroup comparison of pain between Group I and Group II

| Duration | Group I Mean ±SD | Group II Mean ±SD | p |
|--------------|---------------------|----------------------|-------|
| Baseline | 4.81±1.34 | 5.25±1.64 | 0.675 |
| three months | 0.92±1.24 | 0.98±1.52 | 0.764 |
| Six months | 0.21±1.31 | 0.35±1.21 | 0.742 |

Table 2: Intergroup comparison of mobility between Group I and Group II

| Duration | Group I Mean ±SD | Group II Mean ±SD | p |
|--------------|---------------------|----------------------|------|
| Baseline | 0.00±0.00 | 0.00±0.00 | 1.20 |
| three months | 0.34±0.21 | 0.45±0.31 | 1.31 |
| Six months | 0.41±0.32 | 0.57±0.63 | 0.67 |

Table 3: Intergroup comparison of crestal bone loss between Group I and Group II

| Duration | Group I Mean ±SD | Group II Mean ±SD | p |
|--------------|------------------|-------------------|------|
| Baseline | 0.38±0.00 | 0.34±0.00 | 0.42 |
| three months | 0.61±0.21 | 0.48±0.31 | 0.05 |
| Six months | 0.84±0.32 | 0.57±0.63 | 0.02 |

Immediate implant placement is much superior to delayed implant placement, according to Jalaluddin et al's assessment of the effects of immediate and delayed clinical implant implantation on the crestal bone [1]. Managutti et al. examined the success rates two years after implant placement, clinical outcomes related with immediate and delayed implants, pocket depth, and radiographic marginal bone loss. They came to the conclusion that the rapid insertion of dental implants is much better than the delayed implantation of implants [10]. The Crestal bone resorption around immediately placed vs. delayed implants was examined by Schwartz-Arad et al. They discovered that the immediate implants lost less Crestal bone than the delayed implants after an average of 3.5 years [11]. These outcomes support our conclusions. In comparing the immediate and delayed placement of implants on crestal bone height, Hameed et al discovered that the immediate implant placement preserves crestal bone and prevents gingival architecture [12].

Amin et al evaluated the bucco-lingual crestal bone alterations following immediate and delayed insertion of implants and came to the conclusion that healing was similarly good in both groups [8]. In both the immediate and delayed groups, Mohindra found no difference in the crestal bone alterations that were seen [9]. In their comparison of the immediate and delayed implantation of dental implants in the bucco-lingual direction of the Crestal bone width, Ali et al. came to the conclusion that both groups' bone healing was good [4]. According to Bilhan et al., bone loss was larger when implant placement was postponed because of disuse atrophy [13]. Shitole et al found significant bone loss with immediate implant placement in comparison to delayed placement and insignificant result for pain and mobility [2]. The results are in contrast to our findings. However, Rana et al concluded that delayed implant placement showed better bone healing compared to convention group [14].

The advantages of the immediate placement of implant into extraction sites are three folds, the significant reduction in treatment time for the patient, directly related to the greater bone volume resulting from ridge preservation [15].

4. Limitation of the study

The limitations are smaller sample size. Further research is needed on larger samples size.

5. Conclusion

It was determined that during the baseline to sixth month observation period, Group I (delayed implantation)

experienced considerable crestal bone loss at both the mesial and distal surface. Furthermore, both groups saw ongoing bone resorption over time. Further research is necessary because it is impossible to evaluate the long-term survival of two-piece implants in either group given the study's small sample size, brief duration, and CBCT measurement of crestal bone loss during follow-up.

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