**Journal of Advanced Medical and Dental Sciences Research**

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

# Original Research

## To compare the bone loss of the immediate versus delayed loading of dental implants

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***ABSTRACT:***
**Background:** Use of dental implants for replacement of missing tooth changed the face of prosthetic dentistry. Numerous practitioners now advocate immediate loading of implants. Hence; the present study was undertaken for comparing the bone loss of the immediate versus delayed loading of dental implants. **Materials & methods:** A total of 40 patients with presence of mobile mandibular first molar were included in the present study. All the patients were divided broadly into two study groups with 20 patients in each group as follows: Group A: Immediate loading dental implant group, Group B: Delayed loading dental implant group. In group A, immediate loading dental implants were placed. Post-implant surgery, radiographs were taken and crestal bone levels around dental implant were assessed radiographically. Group B patients were recalled after 2 months of extraction. Delayed loading implants were placed in them and crestal bone levels around dental implants were assessed. All the patients were recalled after one year and crestal bone levels were assessed again. **Results:** Crestal bone levels among the patients of group A and group B immediately after placement of dental implants were 8.92 mm and 8.86 mm respectively. On one year follow-up, the mean crestal bone levels among Group A and group B patients were found to be 7.90 mm and 7.74 mm respectively. Non-significant results were obtained while comparing the crestal bone loss among immediate loading and delayed loading dental implants. **Conclusion:** Amount of crestal bone loss is similar in both the immediate loading and delayed loading dental implants. Hence; immediate loading implants should be preferred as they reduce the time delay for functional rehabilitation.
**Key words:** Delayed loading, Immediate loading, Dental implant.

Received: August 15, 2020 Accepted: October 25, 2020

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**This article may be cited as**: Priya P, Khurma A, Rani S, Sinha A, Tiwari S, Tewari NK. To compare the bone loss of the immediate versus delayed loading of dental implants. J Adv Med Dent Scie Res 2020;8(11):142-144.

## INTRODUCTION

Introduction of dental implants for replacement of missing tooth changed the face of prosthetic dentistry, where a missing tooth can receive a restoration more analogous to natural tooth without the hassle of crown and bridge. Implants are becoming a predictable alternative for routine replacements in edentulism.[1-3] After the placement of dental implants, a 3 – 6 month load-free healing period has been traditionally suggested as the optimal period to ensure successful healing and osseointegration. This recommendation is based on the notion that increased vertical or lateral force upon the implant during the healing phase results in implant motion, aberrant healing and fibrous tissue encapsulation, rather than the bone formation and osseointegration. More recently, however, this clinical suggestion has been challenged. Numerous practitioners now advocate immediate loading of implants (i.e. placing a full occlusal load onto the implant via the prosthesis, within 72 hours after placement).[4-6] Hence; the present study was undertaken for comparing the bone loss of the immediate versus delayed loading of dental implants.

## MATERIALS & METHODS

The present study was undertaken with the aim of assessing and comparing the bone loss of the immediate versus delayed loading of dental implants. A total of 40 patients with presence of mobile mandibular first molar were included in the present study. Patients with presence of local and generalized periodontal pathologies were excluded from the present study. All the patients were scheduled for extraction of mandibular first molar and were recalled in the morning. Fasting blood sugar and hemodynamic parameters were assessed. All the patients were divided broadly into two study groups with 20 patients in each group as follows:

Group A: Immediate loading dental implant group,

Group B: Delayed loading dental implant group

Preoperative both IOPA and OPG of all the patients was done. Dental extractions were carried out in all the patients. In group A, immediate loading dental implants were placed. Post-implant surgery, radiographs were taken and crestal bone levels around dental implant were assessed radiographically. Group B patients were recalled after 2 months of extraction. Delayed loading implants were placed in them and crestal bone levels around dental implants were assessed. All the patients were recalled after one year and crestal bone levels were assessed again. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis. Student t test was used for comparing the crestal bone levels. p-value of less than 0.05 was taken as significant.

## RESULTS

40 patients with presence of mobile mandibular first molar were included in the present study. All the patients were divided broadly into two study groups with 20 patients in each group as follows: Group A: Immediate loading dental implant group, Group B: Delayed loading dental implant group. Mean age of the patients of group A and group B was 52.3 years and 53.6 years respectively. Majority of the patients of both the study groups were males. Crestal bone levels among the patients of group A and group B immediately after placement of dental implants were 8.92 mm and 8.86 mm respectively. On one year follow-up, the mean crestal bone levels among Group A and group B patients were found to be 7.90 mm and 7.74 mm respectively.

**Table 1:** Demographic data

| Parameter | | Group A | Group B |
|---|---|---|---|
| Age group (years) | Less than 45 | 6 | 8 |
| | More than 45 | 14 | 12 |
| Gender | Males | 13 | 11 |
| | Females | 7 | 9 |

Mean crestal bone loss among the Group A and Group B patients was found to be 1.02 mm and 1.12 mm respectively. Non-significant results were obtained while comparing the crestal bone loss among immediate loading and delayed loading dental implants.

**Table 2:** Comparison of crestal bone levels

| Time interval | Group A | Group B | p-value |
|---|---|---|---|
| After placement of dental implant | 8.92 | 8.86 | 0.42 |
| One year follow-up | 7.90 | 7.74 | 0..71 |
| p- value | 0.01 (Significant) | 0.03 (Significant) | |

**Table 3:** Comparison of crestal bone loss

| Crestal bone loss | Group A | Group B |
|---|---|---|
| Mean | 1.02 | 1.12 |
| SD | 0.19 | 0.21 |
| p- value | 0.72 | |

## DISCUSSION

Beginning of the era of implant prosthesis, two stage procedures were followed with waiting period of three to six months from implant insertion to loading. Meanwhile, patients had to deal with functional concerns until osseointegration and the fabrication of a new prosthesis. Not only the functional concerns, but also the psychosocial impact of missing teeth can be overwhelming to patients. The immediate implant is designed to prevent bone resorption following extraction. With this method, the ridge dimension and height are maintained and some surgical procedures omitted, shortening the healing period.[7- 10] Hence; the present study was undertaken for comparing the bone loss of the immediate versus delayed loading of dental implants.

In the present study, majority of the patients of both the study groups were males. Crestal bone levels among the patients of group A and group B immediately after placement of dental implants were 8.92 mm and 8.86 mm respectively. Crespi R et al reported a clinical comparative assessment of crestal bone level change around single implants in fresh extraction sockets in the esthetic zone of the maxilla either immediately loaded or loaded after a delay. 40 patients required 1 tooth extraction (ie, 1 tooth with a hopeless prognosis) and were randomized into either the test group or the control group. The control group resulted in a mean mesial bone loss of 1.16 +/- 0.32 mm and a mean distal bone loss of 1.17 +/- 0.41 (mean bone loss, 1.16 +/- 0.51 mm). The test group resulted in a mesial bone loss of 0.93 +/- 0.51 mm and a distal bone loss of 1.1 +/- 0.27 mm (mean bone loss, 1.02 +/- 0.53 mm). No statistically significant difference between control and test groups (P > .05) was found.[10]

In the present study, on one year follow-up, the mean crestal bone levels among Group A and group B patients were found to be 7.90 mm and 7.74 mm respectively. Najafi H et al compared the outcomes of immediate and delayed rehabilitation of edentulous jaws by means of two straight and two tilted implants after one year of function. According to the implant insertion torque and the need for bone grafting, implants were loaded immediately (at 72 hours) or delayed (after four months) using a fixed metal resin prosthesis. One axial implant failed in the delayed group after one year of loading, resulting in cumulative implant survival rate of 99.3%. The mean marginal bone loss was 0.84mm. No significant difference was found between axial and tilted implants in the two groups (P>0.05) Based on the results, immediate or delayed fabrication of final prosthesis on two tilted and two axial implants did not result in significant differences in survival rates or marginal bone loss.[11]

In the present study, Mean crestal bone loss among the Group A and Group B patients was found to be 1.02 mm and 1.12 mm respectively. Non-significant results were obtained while comparing the crestal bone loss among immediate loading and delayed loading dental implants. Amin V et al compared the bucco-lingual crestal bone changes after immediate and delayed placement of implants. Immediate implant group showed a mean width of 8.80 mm (SD2.280) at the time of implant placement whereas, 7.60 mm (SD 1.871) after six months. Delayed implant group showed a mean width of 8.40 mm (SD1.673) at the time of implant placement, and 7.40 mm (SD 1.658) after six months. Intragroup showed statistically significant data (P<0.05). When the intergroup comparison of group 1 and group 2 was made at implant placement day and abutment placement day, it was found to be statistically non-significant. Their study suggested that circumferential defect heals on itself without any guided bone regeneration in both the groups.[12]

## CONCLUSION

From the above results, the authors conclude that amount of crestal bone loss is similar in both the immediate loading and delayed loading dental implants. Hence; immediate loading implants should be preferred as they reduce the time delay for functional rehabilitation.

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