

ORIGINAL RESEARCH

Evaluation of Efficacy of immediate and delayed loading of dental implants -A prospective study

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ABSTRACT

Aim- The present study was conducted for assessing and comparing the efficacy of immediate and delayed loading of dental implants. **Materials & Methods-** 40 patients scheduled to undergo dental implant procedures were enrolled. All the patients were randomized into two study groups as follows: Immediate loading group and Delayed loading group. Patients with history of any systemic illness were excluded from the present study. All the patients underwent dental implant procedures according to their respective study groups. Post-treatment evaluation was done using IOPA radiographs. Radiographic bone loss was assessed at different time intervals. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software. **Results-** Mean age of the patients of immediate group and delayed group was 28.9 years and 30.7 years respectively. Majority proportion of patients of both the study groups were males. While comparing the mesial and distal bone loss among the patients of the immediate and delayed study group at different time intervals, non-significant results were obtained. **Conclusion-** Both immediate and delayed method of dental implant placement are equally effective.

Keywords- Implants, Bone, Loaded

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INTRODUCTION

Dental implants have become a widely accepted solution for rehabilitating partial or complete edentulous, boasting a high survival rate for implant-supported restorations. This success has led to an increasing number of individuals choosing dental implants for their oral rehabilitation needs^{1,2}. Notably, for single-tooth gaps, dental implants have emerged as a valuable replacement option, supported by a wealth of research. In contemporary implantology, immediate loading for single-tooth replacements has gained traction³. This approach involves placing the prosthetic restorative material within 48 to 72 hours of implant placement, offering various advantages such as improved cosmetic, functional, and psychological outcomes for patients. A Cochrane systematic review of randomized controlled trials (RCTs) assessing loading timing for implants revealed that immediate loading of mandibular implants in selected areas can be as effective as conventional implants during the healing period^{4,5}. While some studies have found no significant differences in failure rates between immediate loading and delayed loading, others have indicated a higher incidence of implant failures with

immediate loading compared to conventionally loaded dental implants⁶. Hence; the present study was conducted for assessing and comparing the efficacy of immediate and delayed loading of dental implants.

MATERIALS & METHODS

The present study was conducted for assessing and comparing the efficacy of immediate and delayed loading of dental implants. 40 patients scheduled to undergo dental implant procedures were enrolled. All the patients were randomized into two study groups as follows:

Immediate loading group and Delayed loading group. Patients with history of any systemic illness were excluded from the present study. All the patients underwent dental implant procedures according to their respective study groups. The patient was given both verbal and written instructions about postoperative routine. Patients were advised to rinse with 0.2% chlorhexidine gluconate twice daily and to take antibiotics and analgesics for three more days after surgery to minimize postoperative pain and swelling. Post-treatment evaluation was done using IOPA radiographs. Radiographic bone loss was

assessed at different time intervals. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

RESULTS

Mean age of the patients of immediate group and delayed group was 28.9 years and 30.7 years

respectively. Majority proportion of patients of both the study groups were males. While comparing the mesial and distal bone loss among the patients of the immediate and delayed study group at different time intervals, non-significant results were obtained.

Table 1: Comparison of mesial bone loss (mm)

Radiographic bone loss	Immediate group	Delayed group	p-value
Baseline	0	0	-
At one month	1.13	1.10	0.46
At three months	1.60	1.11	0.28
At five months	1.60	1.05	0.11

Table 2: Comparison of distal bone loss (mm)

Radiographic bone loss	Immediate group	Delayed group	p-value
Baseline	0	0	-
At one month	1.05	1.10	0.88
At three months	1.40	1.05	0.19
At five months	1.43	1.15	0.37

DISCUSSION

The integration of osseointegrated dental implants into clinical practice represents a significant advancement in prosthetic dentistry. Implant dentistry has continually evolved, particularly in recent years, with the development of new implant management protocols, advanced diagnostic procedures, and innovative surgical techniques. The success of implant dentistry hinges largely on the establishment of a stable bone-to-implant interface. Typically, implant placement follows a two-stage protocol, where implants are initially installed and then left to heal for a period of 3-4 months in the mandible and 6-8 months in the maxilla to facilitate osseointegration⁷. However, this prolonged healing period necessitates patients to wait for an extended duration before receiving their permanent prostheses. During this time, patients often wear provisional prostheses, which may not be aesthetically pleasing. The concept of early or immediate loading of implants emerged in 1990 with the publication of the first study on this topic, primarily focusing on the mandible of carefully selected patients⁸. Immediate loading has since become a commonly performed surgical procedure, particularly in cases where the mandible exhibits good bone quality⁹. This approach has significantly reduced the waiting period for patients, allowing for the placement of permanent prostheses shortly after implant surgery.

Mean age of the patients of immediate group and delayed group was 28.9 years and 30.7 years respectively. Majority proportion of patients of both the study groups were males. While comparing the mesial and distal bone loss among the patients of the immediate and delayed study group at different time intervals, non-significant results were obtained. In a study conducted by Crespi et al.¹⁰, the clinical evaluation focused on assessing crestal bone level

changes around single implants placed in fresh extraction sockets within the esthetic zone of the maxilla. The implants were either immediately loaded or loaded after a delay. The results revealed that the success rate and radiographic outcomes of immediate restorations of dental implants in fresh extraction sockets were comparable to those achieved with delayed loading protocols. Similarly, findings from Ebenezer et al.¹¹ supported these conclusions, demonstrating that the majority of immediate implants exhibited excellent osseointegration. The potential reason for the failure of immediate loading of implants lies in the continuous micromovement of the implant caused by functional forces at the bone-implant interface. This movement can result in the formation of fibrous tissue instead of the desired bone-to-implant contact, ultimately leading to implant failure¹². The duration of the lag period between implant placement and loading has been a subject of investigation for many years, with different authors expressing varying perspectives^{13,14}.

CONCLUSION

Both immediate and delayed method of dental implant placement are equally effective.

REFERENCES

- Mangano C, Iaculli F, Piattelli A, Mangano F. Fixed restorations supported by Morse-taper connection implants: A retrospective clinical study with 10–20 years of follow-up. *Clin Oral Implants Res* 2015;26:1229–1236.
- Kwon T, Bain PA, Levin L. Systematic review of short- (5–10 years) and long-term (10 years or more) survival and success of full-arch fixed dental hybrid prostheses and supporting implants. *J Dent* 2014;42:1228–1241.
- Mangano F, Macchi A, Caprioglio A, Sammons RL, Piattelli A, Mangano C. Survival and complication

- rates of fixed restorations supported by locking-taper implants: A prospective study with 1 to 10 years of follow-up. *J Prosthodont* 2014;23:434–444.
4. Mangano FG, Shibli JA, Sammons RL, Iaculli F, Piattelli A, Mangano C. Short (8-mm) locking-taper implants supporting single crowns in posterior region: A prospective clinical study with 1-to 10-years of follow-up. *Clin Oral Implants Res* 2014;25:933–940.
 5. Jung RE, Zembic A, Pjetursson BE, Zwahlen M, Thoma DS. Systematic review of the survival rate and the incidence of biological, technical, and aesthetic complications of single crowns on implants reported in longitudinal studies with a mean follow-up of 5 years. *Clin Oral Implants Res* 2012;23(suppl 6):2–21.
 6. Moraschini V, Porto Barboza E. Immediate versus conventional loaded single implants in the posterior mandible: A meta-analysis of randomized controlled trials. *Int J Oral Maxillofac Surg* 2016 45:85–92
 7. Esposito M, Grusovin MG, Willings M, Coulthard P, Worthington HV. Interventions for replacing missing teeth: different times for loading dental implants. *Cochrane Database Syst Rev*. 2007 Apr;18(2):CD003878.
 8. Schnitman PA, Wöhrle PS, Rubenstein JE. Immediate fixed interim prosthesis supported by two-stage threaded implants: methodology and results. *J Oral Implantol*. 1990;16:96e105.
 9. Branemark PI, Engstrand P, Öhrnell LO, et al. Branemark Novum: a new treatment concept for rehabilitation of the edentulous mandible. Preliminary results from a prospective clinical follow up study. *Clin Implant Dent Relat Res*. 1999;1:2e16.
 10. Crespi R, Capparé P, Gherlone E, Romanos GE. Immediate versus delayed loading of dental implants placed in fresh extraction sockets in the maxillary esthetic zone: a clinical comparative study. *Int J Oral Maxillofac Implants*. 2008 Jul-Aug;23(4):753-8.
 11. Ebenezer V, Balakrishnan R. Immediate Vs Delayed Implants: comparative study of 100 cases. *Biomedical and Pharmacology Journal*. 2015 Oct 25;8(October Spl Edition):375-8.
 12. Adell R, Lekholm U, Rockler B, Branemark PI. A 15 year study of osseointegrated implants in treatment of edentulous jaw. *Int J of Oral Surg*. 1981 Dec;10(6):387e416.
 13. Wagenburg BD, Ginsburg TR. Immediate implant placement on removal of the natural tooth: retrospective analysis of 1081 implants. *Compend Contin Educ Dent*. 2001 May;22(5). 399e404, 406, 408.
 14. Hahn J. Single-stage, immediate loading, and flapless surgery *J Oral Implantology* 2000;26(3):193e198.