ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 7, Issue – 5, October – 2024, Page No. : 39 - 43

Survival and success rate of early vs immediate implant placement- A comparative study

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Citation of this Article: Dr Manoj Kumar Yadav, Dr Shipra Shukla, Dr. Abhishek Gakhar, "Survival and success rate of early vs immediate implant placement- A comparative study", IJDSIR- October – 2024, Volume –7, Issue - 5, P. No. 39 – 43.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: In order to shorten treatment times and improve aesthetics, immediate implant insertion into extraction sockets has gained widespread acceptance as a treatment alternative. This study set out to evaluate and compare the success and survival rates of immediate versus delayed implant treatment, as well as look at how patient and site-specific factors affected the course of the treatment.

Method: Information about implant placement after a year was gathered, including demographics and traits. In addition to other variables like bone loss and pocket depth, survival and success rate were noted.

Results: Of the 100 patients who underwent implant placement, 54 underwent immediate placement and 46 underwent early placement. In the early placement group, the survival rate was 98.00%, whereas it was 90.00% in the immediate placement group.

Conclusion: The study's findings imply that early implant placement had somewhat higher success and survival rates than immediate placement.

Keywords: Dental Implant, Survival, Immediate

Introduction

Implant-supported restorations are a commonly recognized treatment method for replacing lost teeth. Per-Ingvar Branemark established the traditional regimen for dental implant therapy in the 1980s.[1,2] By definition, an implant is "any object or material—such as tissue or an alloplastic substance—that is partially or fully inserted into the body for medical, scientific, prosthetic, or diagnostic purposes." Aesthetic zone tooth loss is a painful event, phonetically compromised or not.

Therefore, one of the most difficult scenarios a physician faces in the aesthetic zone is implant-supported single tooth replacement.[3]

Conventional procedures state that a healing period of three to four months is necessary for the consolidation of the extraction socket. Patients often have to wait up to a year for the replacement of a missing tooth, considering the prosthetic therapy. Following tooth extraction, rapid implant placement—which is the process of placing a dental implant into a newly created extraction socket—has been deemed a reliable and appropriate technique.[4] The benefits of immediately implanting into extraction sockets over delayed implant placement include the elimination of the need to wait for the bone to grow for 4-6 months following extraction and a lower rate of crestal bone loss with immediate implant placement as opposed to delayed implant placement. Dental implants are inserted 4–8 weeks following tooth extraction as part of early implant implantation.[5] This surgical technique permits appropriate healing of the soft tissues while occurring before the majority of the hard tissue modifications. Compared to immediate implant placement, early implant placement may provide a slightly enhanced stability of the peri-implant hard and soft tissues, resulting in more favorable esthetic outcomes[6].

Appropriate patient selection is a frequent element in the survival and success of dental implants. To ensure the success of a dental implant, it is crucial to understand the risks associated with implant failure, identify potential implant sites, and develop a treatment strategy. Therefore, in order to determine whether immediate implant insertion is a viable therapeutic option when compared to early treatment, large-scale studies should be done. In this retrospective, population-based analysis, the survival and success rates of early and immediate implant treatment were evaluated and compared.

Methodology

The Department of Oral and Maxillofacial Surgery at the Career Post Graduate Institute of Dental Science and Hospital in Lucknow was the site of this retrospective single-center investigation. Every patient who had an implant placed between April 2023 and March 2024 participated in the trial. The institutional ethics committee gave its approval to the protocol. In this retrospective analysis, implant placement was divided into two groups: immediate and early insertion. Two dentists with training placed the dental implants. Cases satisfying the inclusion criteria were those in which informed consent was given, all patients satisfied the diagnostic requirements for implant placement, there were no surgical contraindications, informed consent was obtained, and the female participants were not menstrual, pregnant, or lactating. This study excluded patients with head and neck cancer treatments, liver or kidney disease, uncontrolled diabetes mellitus, chronic steroid use, alcoholism, drug abuse, severe periodontal diseases, local pathology or inflammation at the surgical site, and failure to follow post-implantation physician instructions regarding osseointegration.

Using patient records, datasheets were generated that included the patient's OPD number, age at implant placement, gender (male or female), dental and implant site information, medical history, and implant placement procedure (immediate or delayed). The clinical and radiographic evaluation criteria from Misch et al. were used to define implant success and survival.[7] An implant is deemed effective if there is radiographic bone loss less than 2 mm after the initial surgery implant, no pain or tenderness during usage, no movement, and no history of exudates. An implant is deemed to have a satisfactory

survival rate if there is a 2-4 mm loss of bone. The implant is deemed to have impaired survival if the radiographic bone loss is less than 4 mm (less than half of the implant body) without mobility and the probing depth is less than 7 mm with a history of exudates. A clinical failure is defined as pain during use, movement, radiographic bone loss greater than half the implant's length, or uncontrollably exuding bone. For the characteristics of the patients and implant sites, descriptive statistics were computed, such as frequencies, means, and standard deviations. To evaluate the statistical differences between the immediate and early implant implantation treatment groups, chi-square and t-tests were used.

Results

A total of 100 implant placements were conducted over one year, with 46.00% classified as early and 64.00% as immediate implant placements. Table 1 presents the demographic, location, and patient characteristics of both the immediate and delayed implant therapy groups, together with the total population. The average age of patients in the immediate implant group was 46.27±4.84, whereas in the early implant group, it was 43.85±6.72.

Various parameters and characteristics of implant implantation, including bone graft need, vertical bone loss, periodontal pocket depth, and follow-up, were also documented. There is no substantial difference between the two groups across all metrics. The percentage requirement of bone graft was 16.94% for the immediate implant placement group and 19.92% for the early implant placement group. The periodontal pocket depths in the groups were 3.17 and 3.82, respectively. Of the 64 implants, 6 in the immediately inserted group were lost at 3 months and 5 months post-loading. 48 (82.75%) of all immediately inserted implants were successful with optimal health; 6 (10.34%) exhibited satisfactory survival; and 4 (6.89%) experienced compromised survival. The average survival rate of the immediate placement cohort was 93.33% (Table 2). The success percentage of the early implanted implants was 31 (91.17%). Two (5.88%) exhibited satisfactory survival, whereas one (2.94%) experienced compromised survival.

Table 1: Demographic and patient characteristics of the immediate and early implant groups

Characteristics		Immediate	Early	p-value
Age		46.27±4.84	43.85±6.72	0.843
Gender	Male	30	24	0.486
	Female	34	22	
Arch	Maxilla	28	21	0.419
	Mandible	26	25	
Region	Anterior	19	17	0.083
	Posterior	35	29	
Outcome	Survival	58	44	0.035*
	Failure	6	2	

Table 2: The success and survival rates of immediate vs early implant placement

Characteristics	Immediate	Early
Success rate	48	36
Satisfactory survival implant	6	6
Compromised survival implant	4	2
Clinical failure	0	0
Implant loss	6	2
Survival rate	58	44

Discussion

This study aimed to examine the survival and success of implants implanted immediately and early (4-8 weeks) after tooth extraction. Immediate implant insertion was initially documented in the 1970s by Schulte and Heinke, and it has since gained popularity comparable to

traditional placement. Immediate implantation offers numerous advantages compared to traditional methods, including the necessity for a single procedure and a decreased overall treatment duration.[8]

The total survival percentage of implants placed shortly after tooth extraction was 95.65%, whereas implants introduced in fully healed extraction sockets had a survival rate of 90.62%.

The immediate insertion procedure may jeopardize outcomes due to its inability to anticipate bone remodeling. A study indicated that the average gap between buccal and lingual or palatal bone diminishes from 10.5 mm to 6.8 mm six months following immediate implant insertion.[9] Covani et al.[10] indicated that the vertical gap between the implant shoulder and the bone crest varied from 0 to 2 mm (mean 0.8 mm) six months following initial insertion. Additionally, insufficient soft tissue may induce stress in the mucoperiosteal flap, potentially leading to bone graft exposure and implant failure in immediate implant loading, a concern not present with early implant loading. Early implant insertion occurs 4–8 weeks post-tooth extraction and lowers overall treatment duration relative to conventional methods.

Meijer et al.[10] observed a survival percentage of 73.3% for implants placed immediately in the molar region. Ji et al.[11] discovered that postponed placement resulted in increased implant survival. Chaushu et al.[12] examined the immediate and non-immediate loading of dental implants, reporting a survival percentage of 82.4% for immediate loading versus 100% for non-immediate loading.

The findings of this study indicated that the early implant placement strategy is more effective than immediate installation; nevertheless, the limited follow-up period of only one year precludes accurate predictions regarding the survival rate. Further studies must be undertaken to evaluate the long-term outcomes of dental implants, taking into account aspects not addressed in the current research.

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