

Assessing The Effectiveness Of Early Implant Placement: A Comprehensive Evaluation".

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Abstract

Background:- Early implant placement after 4-8 weeks following extraction has become a widely acceptable treatment option to decrease treatment time and enhance esthetics. The objectives of this study were to assess and compare the success and survival rates of early implant treatment. Method:- Data of early implants placement were collected with demographic details and characteristics. Survival and success rate as well as other factors like bone loss and pocket depth were recorded. Results:- Total eight patients were selected to place implant from OPD. The success rate for early implant placement was 87.5% & survival rate was 100%. Conclusion:- The results of this study suggest that the success and survival rates of early placed implants were remarkable.

Key words: Success rate, survival rate, early implant placement, osseointegration.

Date of Submission: 22-03-2024

Date of Acceptance: 02-04-2024

I. Introduction

The utilization of implant supported restorations for replacing missing teeth is a widely accepted treatment method.¹ Initially introduced by Per-Ingvar Branemark in the 1980s, the classic dental implant protocol involved a healing period of at least six months post- extraction before implant placement.^{2,3} This approach was grounded in the belief that complete soft and hard tissue healing following tooth extraction was necessary for successful osseointegration.³ However, recent research has debunked the necessity for full post- extraction healing before implant placement, leading to the adoption of immediate and early implant placement. Immediate implant placement involves inserting implants into fresh extraction sockets immediately after tooth extraction.⁴ This approach offers advantages, including minimizing surgical interventions and shortening the overall treatment duration with disadvantages of an increased risk of infection and insufficient volume of soft tissue. Early implant placement, which refers to implant placement 4-8 weeks after tooth extraction following complete soft tissue coverage of the extraction socket, was introduced as a viable treatment alternative.⁴ It has been suggested that soft tissue healing allows for the resolution of local pathology and provides enhanced soft tissue volume.^{5,6} Appropriate patient selection is the most common factor for the survival and success of dental implant. This study aimed to assess the survival and success rate of early implant placement.

II. Methodology

This study was conducted in the Department of Oral and Maxillofacial surgery, People's Dental Academy. Total 8 patients were selected from the out-patient department (OPD) and screened with a thorough case history and clinical examination to rule out any systemic element that can adversely impact bone and soft tissue healing. Inform/written consent was taken from all the subjects. Radiographic examination with a cone beam computed tomography (CBCT) was used for the assessment of bone morphology at the potential recipient site. Eligibility criteria includes good local and systemic health, adequate inter arch clearance, absence of para-functional habits, absence of any neurological/ cognitive/ psychomotor disability, adequate bucco-lingual width with acceptable thickness of cortical plate commensurate with functional requirements of the site being restored & absence of periodontal bone disease.

Procedure

Patients randomized to the immediate-delayed implant placement group, just after tooth extractions, had sockets closed with flaps, when possible. After 6 weeks of soft tissue healing, a mucoperiosteal flap was elevated, the wider diameter of the socket was measured in mm, rounded to the nearest 0.5 mm, using a graduated periodontal probe, and implants were placed as previously described. Once an implant was placed, the largest gap between the bony wall and the neck of the implant was measured (rounded to the nearest 0.5 mm) with a periodontal probe and the operator reconstructed (with Novabone bioactive synthetic bone graft) all 'poorly preserved' sockets and 'partially preserved' sockets in the aesthetic areas (between both upper second upper premolars). The grafted area was then covered with a resorbable membrane fixed

with tacks. The wound was completely covered with soft tissues. For all patients, a baseline periapical radiograph of the implant was taken with the paralleling technique after implant insertion/site augmentation. Implants were left to heal unloaded for 3 months. After 3 months, second stage surgery was initiated. Mid crestal incision was placed and flap was reflected. Cover screw was removed and per mucosal extension was placed for a period of 21 days. This resulted in formation of a gingival cuff or gingival collar. Per mucosal extension was removed with the help of hex driver, abutment was placed over the implant and top screw was tightened. Patients were reviewed at 3 months with evaluation of all clinical and radiographic parameters.

III. Implant Success And Survival

The determination of implant success and survival is based on clinical and radiographic assessments following the criteria outlined by Misch et al. If there are no indications of pain, tenderness, mobility, or exudates, and radiographic bone loss is less than 2 mm from the initial surgery, the implant is deemed successful. In cases where bone loss ranges from 2 to 4 mm, the implant is considered to have achieved satisfactory survival. However, if 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, the survival of the implant is compromised. Clinical failure is determined if there are indications of pain, mobility, radiographic bone loss exceeding half the implant length, or uncontrolled exudates.

Patients were recalled at an interval of 3 months after loading and assessed for implant success rate, peri implant marginal bone level changes, aesthetics and patient satisfaction. Statistical analysis was carried out using chi square test.

IV. Results

A total 8 implant placement was done. The demographic, site and patient characteristics of early implant treatment groups as well as of the total population are shown in table 1 and success rate in table 2.

Table 1. Demographic and patient characteristics of early implant groups

Characteristics	Early implant group
Gender	Male 5(62.5%)
	Female 3(37.5%)
Tabacco use	Yes 2(25%)
	No 6(75%)
Arch	Maxilla 6(75%)
	Mandible 2(25%)
Region	Anterior 5(62.5%)
	Posterior 3(37.5%)

Table 2:- The success and survival rate of early implant placement

Characteristics	Early implant placement
Success rate	7(87.5%)
Satisfactory survival implant	0
Compromised survival implant	1(12.5%)
Clinical failure	0
Survival rate	8(100%)

Table 1 shows maximum patients in the present study are 62.5% males while 37.5% females. 25% of patients consume tobacco. Early implant placement in the maxilla is 75% & in the mandible is 25%. In anterior region, placement is 62.5% & in the posterior region is 37.5%.

Table 2 shows success rate is 87.5% with compromised survival implant 12.5% & survival rate is 100%.



Fig 1. Pre operative photograph showing deep distoproximal caries with respect to 46.



Fig 2. Tooth was extracted and socket was left to heal for six weeks.

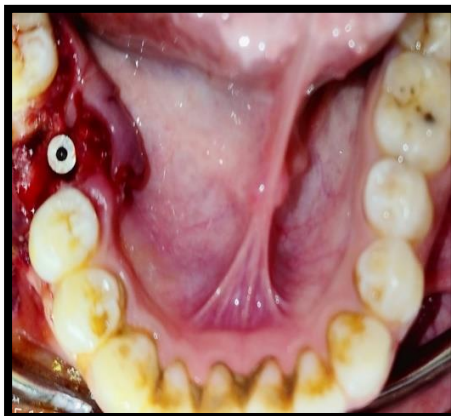


Fig 3. Implant placement done with respect to 46 six weeks after tooth extraction.



Fig 4. IOPA radiograph immediately after implant placement showing position of implant with respect to adjacent teeth.



Fig 5. Implant loading done three months after implant placement.

V. Discussion

This study was undertaken to investigate the viability and effectiveness of placing implants within 4-8 weeks post tooth extraction. Implants inserted within this timeframe exhibited significantly reduced marginal peri-implant bone loss compared to those inserted immediately into fresh extraction sockets. This disparity in bone loss may be attributed to the progressive horizontal and vertical resorption of the extraction socket walls post-extraction.^{7,8} Moreover, early implant placement demonstrated a lower incidence of mid buccal mucosa recession, as highlighted in a 2014 systematic review by Chen & Buser.⁹ The use of tobacco emerged as a significant factor influencing dental implant survival, with nicotine potentially stimulating osteoclastic activity around the implants.¹⁰ While peri-implantitis remains a common complication, its occurrence is more frequent in immediate implant placement due to potential contamination of the extraction socket during surgery and inadequate soft tissue management, hindering proper wound healing. Despite the advantages of early implant placement in terms of peri-implant bone loss, aesthetics, and peri-implantitis, delayed implant placement may offer enhanced bone healing stability over time.

VI. Conclusion

The available evidence confirms the effectiveness of early implant placement. This approach involves allowing a healing period of 4-8 weeks after extraction before implant insertion, facilitating soft tissue healing. Research indicates that this early implant placement protocol promotes greater stability in peri-implant hard tissue. Emphasizing aesthetic outcomes, reduced treatment duration, and achieving primary stability are crucial objectives in implant therapy, followed by proper function and phonetics.

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