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Immediate Implant Placement into Extraction Sockets: A Clinical and Radiographical Evaluation

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## Abstract

Immediate implants are associated with maior development with implantology from past few years. It is a major concern for any edentulous patient to have teeth at its edentulous site right after tooth extraction. The purpose of this study is to determine the survival rate of dental implants placed immediately into fresh extraction sockets, by clinically evaluating the peri-implant soft tissue health and by radiographically evaluating the bone height mesial and distal to the dental implants, post insertion of the implant for 6 months) allow for recovering of normal function.

**Keywords:** Immediate implant, Extraction socket, Bone Resorption

### Introduction

The goal of modern dentistry is to provide a healthy and beautiful smile that is supported by a functional and comfortable occlusion and to prevent tooth loss. Several options are available for the replacement of a single missing tooth. Recently, the two most common treatment options for single tooth replacement are the fixed partial denture and the implant supported prosthesis<sup>1</sup>. After tooth extraction, bone loss remains an important issue in dentistry. Anatomically, bone resorption occur both bucco-lingualy and apico-coronally, and the first 6 months post-extraction are critical, carrying the highest rate of bone resorption in either direction. The clinical anatomic & radiologic characteristic of the socket immediately after tooth extraction distinctly different from the socket environment after 1 year of healing. In situations where teeth required extraction, original protocol (gold standard) suggested a 6 to 12 month wait for healing of the site before implant placement to allow the complete ossification of the extraction socket. The modified protocol wherein implants have been placed at the time of tooth extraction is known as immediate implants. The immediate placement of implants into extraction sockets seems to be a safe and predictable method. After tooth extraction of natural teeth, the greatest reduction of the alveolar or crestal bone occurs in the first 6 months to 2 years. Healing process following tooth extraction leads to a reduction of the external contours of the ridge accompanied by filling of the socket with newly formed bone. The primary advantage of immediate implant placement is the reduction of healing time<sup>2</sup>. Because the implant is placed at the time of extraction, the bone-toimplant healing begins immediately with extraction site healing.

The purpose of this study is to determine the survival rate of dental implants placed immediately into fresh extraction sockets, by clinically evaluating the periimplant soft tissue health and by radiographically evaluating the bone height mesial and distal to the dental implants, post insertion of the implant for 6 months) allow for recovering of normal function. The aim of this study was to evaluate the clinical and radiological feature in immediate implant placement into extraction socket.

The objective of this study are to evaluate the stability of the implant using ISQ, to evaluate the crestal bone level at mesial site around the peri-implant surface radiographically, to evaluate the crestal bone level at distal site around the peri-implant surface radiographically and to evaluate clinically the presence or absence of pain and discomfort according to (Visual Analogue Scale). Presence or absence of periapical radiolucencies on intra oral periapical radiographs pre and post operatively.

### Methodology

The patients for this study were selected from the Out Patient Department of Oral & Maxillofacial Surgery, Mahatma Gandhi Dental College and Hospital, Jaipur. Patients who were found to have maxillary and mandibular teeth indicated for extraction were selected. Patients were selected irrespective of sex, cast and socio-economic status. Informed consent for the procedure was obtained from all the patients enrolled for the study. Before the start of the treatment, the entire procedure and the associated risks were explained to the patient in local language.

### **Inclusion criteria**

1. Patients (male or female) within the age group of 20 -55 years.

2. Presence of a single failing tooth with intact adjacent dentition.

3. Sufficient bone availability apical to the extraction site for stabilization.

4. Patients with good oral hygiene.

5. Adequate bone volume to accommodate an implant of appropriate dimension.

6. Multiple or total extraction cases requiring fixed prosthesis with loss of distal abutment.

#### **Exclusion criteria**

1. Presence of active infection around the failing tooth.

2. A medical history that would complicate the outcome of the study, such as alcohol or drug dependency, history of smoking, poor health or Any other medical, physical or psychological reason that might affect the surgical procedure or the subsequent prosthodontic treatment and required follow- up<sup>3</sup>.

3. Dental history of bruxism, para-functional habits and / or lack of stable posterior occlusion.

4. Perforation and / or loss of labial bony plate following tooth removal.

 Insufficient bone quantity as determined by preextraction radiographs and clinical inspection before implant placement (E.g.: Local cysts, soft tissue ulceration, insufficient healing of previous extraction site).
Insufficient vertical inter-arch space to accommodate the prosthodontic components available, together with a proposed pontic and occasional gingival analog designs.

7. Patients with TMJ disorders.

## Causes for extraction of tooth

- 1. Root fractures.
- 2. Endodontic failures.
- 3. Caries.
- 4. Internal resorption.
- 5. External resorption.
- 6. Tooth with open apex.
- 7. Over-retained deciduous tooth<sup>4</sup>.

A total of 10 patient's male or female, with the age group of 20-55 years, were included in the study each having atleast one tooth indicated for extraction (either maxillary or mandibular teeth) were selected and immediate placement of implants was done into fresh extraction sockets. After implant placement all implants were recorded and evaluated with the following clinical parameters at baseline, and at the time interval of 3 months, 6 months

1. PAIN (According to Visual Analogue Scale)

2. Stability was tested manually and graded according to Resonance Frequency Analysis

3. Radiographic parameters:- IOPA radiographs were taken at the time of implant placement, and at the time interval of 3 months, 6 months to interpret the peri-apical radiolucencies at the apex of the implant and crestal bone level changes

#### **Statistical Analysis**

The above collected data will be compared for each patients and statistical analysis was done for evaluation ANOVA, Paired T-Test, Tukey Hsd Test.





Radiographic Image Analysis Using Vernier Caliper And Metal Scale On Mesial And Distal Sites: (Table 1&2).

A standardized IOPA radiograph taken using long cone paralleling techniques was used.

Mesial: Repeated Measures ANOVA

The height of bone on mesial side from the alveolar crest to the lower border of the crest module that the mean decrease in crestal bone on mesial side at baseline was 1.55mm which changes to 0.85mm at 3months & 0.75mm at 6 months. On application of repeated measure ANNOVA test to changed in crestal bone level was not statistically significant (P=0.095)

Radiographic	Ν	Mean	SD	Median	Min.	Max.	Р
Analysis (mesial)							Value*
Baseline	10	1.55	1.42	1.25	0	4	0.095
3 months	10	0.85	1.94	1	-3	3.5	
6 months	10	0.75	1.83	0.5	-1.5	3	



### Distal

\*Repeated Measures ANOVA<sup>#</sup> Tukey HSD

The height of bone on distal side from the alveolar crest to the lower border of the crest module that mean decrease distal side of crestal bone level distal side on baseline at 1.25mm which changes to, 0.95mm at 3 months & 0.25 at 6 months. On application repeated mesure ANNOVA test changed in crestal bone level was found statistically significant (P=0.041). Pairwise comparsion by TUKEY HSD test found that changes between baseline was in 6 months level was statistically significant

Radiogra	Ν	Mea	SD	Media	Min	Ma	Р	Signific
phic		n		n		x.	Value	ant
Analysis							*	differen
(distal)								ce
								between
								#
Baseline	1	1.25	0.9	1	0	3	0.041	Baselin
	0		8					e & 6
								month
3 months	1	0.95	1.2	1	-1	3	-	
	0		1					
							_	
6 months	1	0.25	1.4	0	-2	3	-	
	0		4					



Clinically Stability According To Isq: (Table 3)

\* Paired t-test, Table no. 3 shows that mean ISQ was 60.60 at baseline which increase to 80.80 at 3 months, pair T-test found this change as statistically significant ( P < 0.001)

Resonance Frequency Analysis (ISQ)	N	Mean	SD	Median	Min.	Max.	P Value*
Baseline	10	60.60	10.88	64	44	74	<0.001
3 months	10	80.80	7.74	79	72	97	



Radiographic Peri-Apical Radiolucency (Table 4)

	Present		Absent	t	Total	Total	
Radiographic Peri-apical Radiolucency	No.	%	No.	%	No.	%	
Baseline	0	0.00	10	100.00	10	100.00	
3 months	0	0.00	10	100.00	10	100.00	
6 months	0	0.00	10	100.00	10	100.00	

Table no. 4 shows no periapical pathology present any post operatively implant placed. (Baseline, 3 months, 6 months)

## Presence of Pain And Discomfort: (Table 5)

\*Repeated Measures ANOVA # Tukey HSD

This table no 5 shows presence of pain and discomfort on baseline 3months and 6months with statistically significant. According to Repeated Measures ANOVA <sup>#</sup> Tukey HSD ( P value <0.001 ) That was statistically significant.

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Pain & Discomfort	N	Mean	SD	Median	Min.	Max.	P Value*	Significant difference between <sup>#</sup>
Baseline	10	3.20	0.92	3	2	5	<0.001	Baseline from 3months; Baseline from 6
3 months	10	0.60	0.52	1	0	1		
6 months	10	0.00	0.00	0	0	0		month



#### Discussion

- Dental implant therapy is the pioneering treatment modality for replacement of missing teeth
- In our study survival rate of Global dental implants which are screw shaped and root form implants are placed immediately into fresh extraction sockets in 10 patients with mean age of 30.4. Our results of the study may be interpreted as follows;

The interpretation of our study revealed that no statistically significant difference was that between the sexes. Statistically No significant difference was present after 6 months in decrease in height of crestal bone level mesial to implant site<sup>5-6</sup>. Statistically significant difference was present after 6 months in decrease in height of crestal bone level distal to implant site. Statistically significant difference was found at baseline and 3 months ISQ values which is suggestive of increased stability of implant of implant at the end of third months No periapical infection radiolucencey developed at the end of 3 months and 6

months post implant placement in 100% patients indication of good osseointegration. Statistically significant difference was present in pain levels , at baseline and post measurement suggestive of reduced pain at the of 6 months

Aman Sachdeva et al stability and crestal bone level study he concluded that there is no significant crestal bone loss at the end of 12 months of his study and also concluded that stability of implant was acheivied which is contradictory to the result of our study showing significant distal side crestal bone loss and similar to our study which shows implant are stable after 6 months.

**Durga Parsad** et al studied implant stability and bone loss after immediate implant placement and concluded that implant were stable after 6 months with no periapical radiolucency and no pain and discomfort to the patients similar to our study, where as there study shows significant mesial and distal bone loss which is contradictory to our study showing only significant distal crestal bone loss.

**P Singh** et al conducted a study for a implant stability and bone loss after 6 months and there results were similar to our study showing that implant stable was and crestal bone loss was present<sup>7</sup>.

**Srinivas Sulugodu** et al studied a crestal bone loss after implant placement the bone height on the mesially and distally site which is simillar to our study.they also study the crestal bone level both mesially and distally whose results of the distal bone loss are to our study.

The following conclusions were the study which was done to evaluate the survival rate of dental implants placed immediately into fresh extraction sockets.

1. Radiographic evaluation of intraoral periapical radiograph of the implant at mesial and distal sites revealed significant decrease in crestal bone level indicating bone remodeling around the implant.

2. Patients initially though complained of pain and discomfort, at the end of the study none of the patients complained of pain and discomfort.

3. In all patient implant stability quotient was statistacally significant.

4. None of the patient in our study had peri-apical radiolucency as shown in intra oral peri-apical radiograph<sup>8</sup>.

Our study clearly demonstrated in a group of patients with and without periodontal disease the survival rate of immediate implants in extraction socket is 100% during follow-up period of 6 months. Possible explanations may be proper case selection, diagnosis, aseptic method of surgery, maintenance of labial cortical plate and good oral hygiene maintenance during follow-up period<sup>9,10</sup>. In order to increase our understanding, studies need to be conducted with longer duration and more samples.

### References

- Lekholm U, Zarb GA. Patient selection and preparation. In: Bränemark P-I, Zarb GA, Albrektsson T, eds. Tissue-Integrated Prosthesis: Osseointegration in Clinical Dentistry. Chicago: Quintessence; 1985:199-209.
- Adell R, Ericsson B, Lekholm U. A long term follow up study of osseointegrated implants in the treatment of totally edentulous jaws. Int J Oral Maxillofac Impl 1990; 5: 347-359.
- Zarb G, Schmitt A. Edentulous predicament. I. A prospective study of the effectiveness of implant supported fixed prostheses. J Am Dent Assoc 1996; 127: 59-72.
- Paolantonio M, Dolci M, Scarano A. Immediate implantation in fresh extraction sockets. A controlled clinical and histological study in man. J Periodontol 2001; 72: 1560 -1571.

- Nemcovsky C.E.; Artzi Z.; Moses O.; Gelernter I. Healing of marginal defects at implants placed in fresh extraction sockets or after 4–6 weeks of healing: A comparative study. Clin Oral Impl Res 2002; 13: 410 -419.
- Cornelini R, Cangini F, Martuscelli G, Wennstrom J. Deproteinized bovine bone and biodegradable barrier membranes to support healing following immediate placement of transmucosal implants: a short-term controlled clinical trial. Int J Periodontics Restorative Dent 2004; 24: 555-563.
- P. Singh, H. G. Garge Evaluation of implant stability and crestal bone loss around the implant prior to prosthetic loading: A six month study2016, IP: 157.47.203.67]
- Aman Sachdeva, Pankaj Dhawan, Pankaj Madhukar, . Implant stability measurements using resonance frequency analysis and radiographic evaluation of crestal bone loss in indigenously developed implants placed in fresh extraction sockets December 9, 2018, IP: 157.47.203.67
- Durga Prasad Tadi, Soujanya Pinisett Evaluation of initial stability and crestal bone loss in immediate implant placement: An in vivo study December 9, 2018, IP: 157.47.203.67]
- Anshul Chugh, Shikha Nandal Original research radiological evaluation of marginal bone around dental implants: A pilot study 15, 2018, IP: 157.47.198.57