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 – 3, Issue – 5, September - 2020, Page No. : 433 - 441

Prospective Study of Immediate Placement of Implants into Infected Debrided Socket

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Citation of this Article: Dr.Tauseef Fazal, Dr. Samreen Fatma, Dr. Rohan Kumar, "Prospective Study of Immediate Placement of Implants into Infected Debrided Socket", IJDSIR- September - 2020, Vol. – 3, Issue - 5, P. No. 433 – 441.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Aims & objective: The aim of this study was to check the clinical outcome of the Survival of Immediate placement of dental implants into debrided infected dentoalveolar socket.

Methods and patients: All patients reporting to the outdoor patient department were evaluated for implant insertion. The study comprised of 20 patients (aged from 20 to 54 years were selected for implant placement.Armamenterium is used for implant placement is surgical guide drill,surgical twisted drill,depth gauge,phisiodispenser with speed reduction handpiece,Hex ratchet and standard diagnostic and basic surgery tools.

Results: The present study was done to evaluate the placement of implants in infected Debrided socket. Observation were made postoperatively on 1 st day, 1stweek, 4thweek, and 12thweek for pre-designed factors which are Pain and Swelling. After the integration period of 4-6 months, the stagesurgery was performed and at this level (baseline), another observation were made at3, 6 and 9 week interval from the baseline

Conclusion: This can be drawn from this study that the implants placed into Infected debrided extraction sites will heal predictably and there are reductions in thenumber of surgical interventions and in the treatment time required.

Introduction

The elusive dream of replacing missing teeth with artificial analogs has been part of dentistry for a thousand years. Conventional rehabilitation of partial or complete tooth loss has limitation for many people and such devices can cause eating difficulties, psychological problems and problems related to esthetics, retention and stability of prosthesis. Because of these problems, patients often suffer decreased self-confidence and develop psychological problems.

Treatment of tooth loss in the anterior maxilla can involve difficult functional, esthetic and

psychological problems, especially in young patients with otherwise good dentition. The prosthetic treatments that have been used i.e. Removable partial dentures, fixed partial dentures, or composite retained only partial dentures, in addition to the risk of complications, most of these treatments include the sacrifice of healthy tooth substance of the adjacent teeth.

In order to overcome the problems associated with conventional prosthesis, implants came into existence. Throughout history many clinicians have attempted to use dental implants as a solution to complete and partial edentulism

The success of osseointegrated dental implants has revolutionized dentistry. the ability to permanently replace missing teeth with a function and appearance close to that of the natural dentition has never been greater. With more than 3 decades of evidence to support the clinical use of osseointegrated dental implants, it is possible to confidently resolve that implants are predictable and provide patients with long-term functional tooth replacement. This is a remarkable accomplishment, considering the many challenges and stresses that the oral environment and forces of mastication present for dental implants. The success of dental implants has transitioned dentistry into an entirely different approach to treatment compared to just 20 years ago.

Material & Methods

The Present study was conducted in the postgraduate clinic of the Department of Oral & Maxillofacial Surgery to clinically evaluate the alveolar crest bone level following the placement of Implant in a Debrided Infected Dentoalveolar Socket . At the time of implant placement (Baseline), at 3 months, 6 month following clinical parameters were recorded :

IOPA radiographs were taken using the Parallel cone technique and assessed at the time of implant placement, at 3 month and 6 months.

The definition of implant success was based on the following clinical and radiologic criteria:

1) Absence of clinically detectable implant mobility,
2) Absence of pain or any subjective sensation,
3) Absence of continuous radiolucency around the implant.

Methods

All patients reporting to the outdoor patient department were evaluated for implant insertion. The study comprised of 15 patients (aged from 20 to 54 years were selected for implant placement. Patients were accepted into the study based on the following:

Inclusion Criteria

1. 18 years or older
2. Presence of a failing tooth by trauma caries, root resorption, endodontic or periodontic failure and with the presence of adjacent dentition.
3. Retained primary teeth (in case of agenesis), as well as patients with tooth loss because of extensive caries
4. Good oral hygiene.
5. Appropriate marginal gingival to underlying bone dimension at the facial aspect (about 4 to 6 mm) of the immediate adjacent teeth as ascertained by bone sounding technique.
6. Sufficient alveolar bone architecture to allow primary bone stability.

Exclusion Criteria

1. The presence of uncontrolled diabetes, immune disease or contraindicating Systemic conditions.
2. Chemotherapy in the 12 month period prior to proposed therapy.
3. Uncontrolled periodontal disease or patient unwillingness to undergo needed periodontal therapy around remaining teeth.

4. An active sinus infection or history of persistent infections.
5. An unwillingness to commit to a long term post therapy maintenance program
6. A smoking habit of 1 packet of cigarettes per day or greater.
7. Alcohol abuse
8. Unrealisticxpectations and psychological problems.The baseline clinical examination consisted of a thorough medical and dental history, general and oral health status, assessment of future implant site. The available vertical, mesiodistal and labiolingual bone dimension were determined by palpation and radiograph. Intraoral periapical radiographs were done to evaluate the volume of remaining bone . In order to prevent infection all surgical procedures were performed under strict aseptic conditions with greatest attention paid for preservation of implant bed. The dental unit, instrument tray, patient, operating assistants were covered with sterile drapes. Sterile surgeon gowns face masks, gloves and instruments wereindispensable. The surgical armamentarium including the tool kit was autoclaved.

The written and informed consent was taken from the all subjects prior to the start of the procedure.

Preparation for surgery was made according to standard protocols.

Amoxicillin (1 g) and dexamethasone (8 mg) were administered 1 hour prior to surgery. Following administration of local anesthesia (2% xylocaine with 1: 80,000 adrenaline), sulcular incisions were made on the buccal and palatal aspects of teeth to be extracted and gingival collar was removed. Teeth were carefully luxated and removed with forceps . Care was taken not to fracture the labial plate of bone and to retain gingival tissue attachment at the mesial and distal crestal bone.

Extraction sockets were debrided with hand instruments to remove granulation tissue and prepared for implantation. The socket depth was measured with the probe and was confirmed with the extracted root . The apical area was prepared for the placement of implant. Bone drilling was performed at revolutionary rates recommended by Branemark i.e. 1000-1500 rpm. To minimize trauma to bone, drilling was performed at low speed, the area was profusely irrigated with chilled saline solution, to avoid overheating and thus necrosis of alveolar bone and sharp instruments were used in progressively increasing diameters. he depth and angulations was checked continuously with the help of depth gauge paralleling pins which has depth markings of 8 to 16 mm. After completion of implant socket preparation Titanium implants were then placed with the collar of the implant at the level of the bone crest on the labial aspect. All implants were placed with primary stability and were completely housed within the extraction socket . After completion, a large bolus of moist gauze was applied over the surgical site for compression. This helped in providing hemostasis and thus reducing the possibility of formation of hematoma. Patient was then advised to follow standard post-operative instruction, which includes ice packs, soft high nutrient diet, post-operative medications which consisted of appropriate antibiotic (amoxicillin 500 mg) ,analgesic (ibuprofen 800 mg, every 4 to 6 hours as needed for pain) were prescribed. Patients were instructed not to brush the surgical site, but rather to rinse with 0.12% chlorhexidine gluconate.

The patient was called for the post-operative checkup after 24 hours. The sutures were removed seven days after the surgery. The patient was called for the post-operative checkup after 24 hours. The sutures were

removed seven days after the surgery. The patients were then followed-up post-operatively at 1st day, 1st week, 4th week and up to 12th week and thereon any other required investigation was done whenever needed.

After completion of the requisite period of 4 to 6 months for bone implant integration, the implant had to be localized and exposed to remove the cover screw and for the placement of abutment head to carry out suitable prosthodontic rehabilitation. Under local anesthesia a small incision was made over the implant parallel to the alveolar ridge, the cover screw was exposed. By using the screw driver the cover screw was removed, area irrigated and the healing cap was placed on the implant and was slowly screwed till it made firm contact with the implant surface . After a lapse of two weeks the healing cap is removed and impression post is placed to take the impression. At 2nd stage surgery crestal bone level was determined with periapical radiograph perpendicular to the implant with mm measurements made from the occlusal surface of the implant.

Results

The present study was done to evaluate the placement of implants in to Debrided infected dentoalveloar socket. The stage I surgery was performed and fourteen implants were placed in 15 patients (12 male and 3 female) who report to the Postgraduate Clinic of Oral and Maxillofacial Surgery. Observation were made postoperatively on 1st day, 1st week, 4th week, and 12th week for pre-designed factors which are Pain and Swelling. After the integration period of 4-6 months, the stage surgery was performed and at this level (baseline), another observation were made at 3, 6 and 9 week interval from the baseline. The two factors evaluated after stage I surgery are pain and swelling and after stage II surgery six factors were evaluated namely mobility, peri-implant radiolucency, mean probing depth, gingival inflammation, sinus discharge and marginal bone loss.

The observed factors were graded as:

The observed factors were graded as:

Pain (VAS) 0-No pain
1 to 3-mild pain
4 to 7 moderate pain
8 to 10 severe pain

Swelling Present = 1
Absent = 0

Mobility Present = 1
Absent = 0

Peri-implant radiolucency: Present = 1
Absent = 0

Mean Probing depth: in m

Gingival inflammation: No inflammation = 0
Mild inflammation = 1
Moderate inflammation
Severe inflammation = 3

Sinus discharge: Present = 1
Absent = 0

Marginal bone loss: in mm.

Table 1: Distribution of implant success at the stage I surgery according to pain

	N	Mean	Std. Deviation	P value
Stage I	27	2.44	0.641	0.000 (S)
1st week	27	0.00	0.000	
4th week	27	0.00	0.000	
12th week	27	0.00	0.000	

Test applied: ANOVA S=significant

Table showed pain-wise success of the stage I surgery. Pain was gradually decreased with the time period which

showed statistically significant results and success of the surgery

Table 2: Intra-group comparison of implant success at the stage I surgery according to pain

Group	Group	Mean Difference	P value
Stage I	1st week	2.44	0.000 (S)
	4th week	2.44	0.000 (S)
	12th week	2.44	0.000 (S)
1st week	4th week	0.000	1.000
	12th week	0.000	1.000
4th week	12th week	0.000	1.000

Test applied: unpaired t test S=significant

Table showed intra-group wise comparison of the stage I surgery. Pain was gradually decreased with the time period but at the 1st, 4th and 12th week there was reduction of pain equally which showed non- statistically significant results.

Table 3: Distribution of implant success at the stage I surgery according to swelling

	N	Mean	Std. Deviation	P value
Stage I	27	1.48	0.509	0.000 (S)
1st week	27	0.00	0.00	
4th week	27	0.00	0.00	
12th week	27	0.00	0.00	

Test applied: ANOVA S=significant

Table showed swelling-wise success of the stage I surgery. Swelling was gradually decreased with the time period which showed statistically significant results

Table 4: Intra-group comparison of implant success at the stage I surgery according to swellin

Group	Group	Mean Difference	P value
Stage I	1st week	1.48	0.000
	4th week	1.48	0.000
	12th week	1.48	0.000
1st week	4th week	0.000	1.000
	12th week	0.000	1.000
4th week	12th week	0.000	1.000

Test applied: unpaired t test S=significant

Table showed intra-group wise comparison of the stage I surgery. Swelling was gradually decreased with the time period but at the 1st, 4th and 12th week there was reduction of pain equally which showed non- statistically significant results.

Table 5: Distribution of implant success at the stage II surgery according to mobility

	N	Mean	Std. Deviation	P value
Baseline	27	0.19	0.396	0.49
3 week	27	0.15	0.362	
6 week	27	0.15	0.362	
12 week	24	0.04	0.204	

Test applied: ANOVA

Table showed mobility-wise success of the stage II surgery. Mobility was gradually decreased with the time period but there was not much mobility showed from baseline to 6 week. At the time period of 12 week showed more improvement in mobility from 0.19 to 0.04 but showed non-statistically significant results

Table 6: Distribution of implant success at the stage II surgery according to peri-implant radiolucency

	N	Mean	Std. Deviation	P value
Baseline	27	0.22	0.424	0.34
3 week	27	0.14	0.483	
6 week	27	0.14	0.483	
12 week	24	0.04	0.204	

Test applied: ANOVA

Table showed peri-implant radiolucency -wise success of the stage II surgery. Peri-implant was gradually decreased with the time period but there was not much improvement showed from baseline to 6 week. At the time period of 12 week showed more improvement in mobility from 0.22 to 0.04 but showed non-statistically significant results.

Table 7: Distribution of implant success at the stage II surgery according to probing depth

	N	Mean	Std. Deviation	P value
Baseline	27	2.15	0.456	0.48
3 week	27	2.33	0.555	
6 week	27	2.33	0.555	
12 week	24	2.25	0.442	

Test applied: ANOVA

Table showed probing depth-wise success of the stage II surgery. Probing depth was gradually increased with the time period but there was not much improvement showed from baseline to 12 week which showed non-statistically significant results

Table 8: Distribution of implant success at the stage II surgery according to gingival inflammation

	N	Mean	Std. Deviation	P value
Baseline	27	0.78	0.424	0.83
3 week	27	0.78	0.577	
6 week	27	0.78	0.577	
12 week	24	0.67	0.482	

Test applied: ANOVA

Table showed gingival inflammation-wise success of the stage II surgery. Gingival inflammation was gradually decreased with the time period but there was not much improvement showed from baseline to 12 week which showed non-statistically significant results

Table 9: Distribution of implant success at the stage II surgery according to sinus discharge

	N	Mean	Std. Deviation	P value
Baseline	27	0.04	0.192	0.59
3 week	27	0.04	0.192	
6 week	27	0.00	0.000	
12 week	24	0.00	0.000	

Test applied: ANOVA

Table showed sinus discharge during the procedure. Sinus discharge absent after 6th and 12th week which showed non-statistically significant results

Table 10: Demographic characteristic of the study

	N	Minimum	Maximum	Mean	Std. Deviation
Age	15	18	54	37.53	12.68
Length	27	12	18	14.69	1.86
Diameter	27	3	4	3.83	0.25

Table 11: Distribution of marginal bone loss on mesial and distal side

Mm	Baseline	3 week	6 week	12 week
Mesial				
<0.5	27	27	27	27
Distal				
<0.5	27	27	27	27

Discussion

Missing teeth and the various attempts to replace them have presented a treatment challenge throughout human history. Although Edentulousness is on the decline, but

with increasing life expectancy it is increasing dramatically in the adult population. Missing teeth can cause loss of self-esteem and have an impact on social interaction. The diminished masticatory efficiency accompanying tooth loss can compromise nutritional status, putting patients at higher risk for chronic illnesses like diabetes, cancer, hypertension, and heart disease. Conventional dentures typically attain only limited success with respect to both patient satisfaction and chewing ability. An implant-retained prosthesis provides greater stability, improved biting and chewing forces, and higher patient satisfaction than conventional denture. Dental implants also may be used to replace teeth in a client who is partially edentulous. Osseointegration provides support for function, while dental implants are used as replacements for natural teeth. However, it was not until the 1960s that the scientific foundation of modern implant dentistry was set. At that time, vital microscopic studies of osseous wound healing initiated by Brånemark and colleagues using the titanium chamber gave rise to the concept of osseointegration. Osseointegration was initially defined on the light microscopic level as “a direct structural and functional connection between ordered, living bone and the surface of a load-carrying implant” Clinical outcome of the implants placed in extraction sockets do not differ from those placed in mature. bone. Marginal gaps occurring between the implant surface and socket wall may predictably heal with bone formation.This hypothesis is supported by many studies like **Boticelli D (**2003).The present study examined in vivo the clinical and radiographic results of 27 osseointegrated implants placed in infected debrided extraction sockets. The results demonstrated that immediate implant lacement offers clinically acceptable results. The result of this study were based on following factors :-Pain, Swelling, Mobility, Gingival Status, Mean probing depth, Peri-implant radiolucency, and Marginal Bone Loss) in fifteen patients who participated in this study. A total of Twenty seven submerged implant were placed in Maxilla and Mandible. Subjective findings of pain and tenderness associated with an implant body are more difficult to assess than these conditions with natural teeth. In our study the pain score was 4 on visual along scale on the next post operative day, this was highest than any other time in our follow ups. Pain can have several orgins: the skill of the surgeon the procedure used, flap design, trauma to periosteum. Pain can be experienced by postoperative edema or hematoma. it is also related to patients anxiety and stress. The pain score declined to 0 on one week after surgery as healing had occurred by that time.

This finding is supported by **Carl e misch, Morton et al (2008),**according to them pain from implant body does not occur unless the implant is mobile and surrounded by inflamed tissue or has rigid fixation but impinges on nerve. **Thomas and Jean et al (2006)** demonstrated that patients experienced more pain postoperatively with open flap technique as compared to a flapless approach. Probing depth around implants is an important diagnostic process for the assessment of peri-implant soft tissue health and increased probing depth could be correlated with a higher degree of inflammation of the peri-implant mucosa. Since the soft tissue seal inhibited probe tip penetration in healthy and only slightly inflamed periimplant soft tissues, but did not do so in periimplantitis, probing around oral implants must be considered as a sensitive and reliable clinical parameter for long-term clinical monitoring of periimplant mucosal tissues.

The mean probing depth was evaluated by Hu-friedy Williams periodontal probe at 3rd week, 6th week and

9th week which were 2.643±0.51mmf, 2.71±0.82mm and 2.30±0.85mm respectively. This is in accordance with **Branemark P I (1995)** where he had stated that a mean value of 2.6mm indicates that implants are in a healthy condition. **Sandra Huber et al** in there one year study on immediate implants in infected debrided extraction sockets found that the probing depth was mostly 3mm and reached 4-5mm in 17% of the implants. **Botticelli et al** after 5 year examination interval found that the mean probing depth varied between 2.1mm and 2.9mm. Hence we can conclude that mean probing depth of this study relates to most of The long term clinical studies carried out.

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