

IMMEDIATE IMPLANT PLACEMENT AFTER EXTRACTION OF MANDIBULAR PREMOLAR: A CASE REPORT

Sunil Kumar Singh¹, K. Sujan²

1. Post Graduate Student PG III year, Department of Prosthodontics, Dental College Azamgarh
2. Head of the Department, Department of Prosthodontics, Crown and Bridge and Implantology. Dental College Azamgarh

ABSTRACT

Immediate dental implant placement is in practice and treatment of choice for at least the past two decades. Generally immediate implants have been placed for the single rooted anterior tooth and single or bi-rooted premolar tooth. The most important aspect of any implant surgery is result with the successful procedure is implant stability and bone to implant contact. Removal of molar teeth and immediate implant placement is a challenging procedure due to multiple root morphology. In the case of immediate placement of dental implants after extraction and preserving alveolar bone properly, especially labial and lingual plates of bone is a must in providing the good environment for maximizing bone to implant contact and implant stability. The position occlusion, function and esthetics of the final restoration must be considered earlier. Minimal alveolar bone removal and bone expansion should be considered and attained as an aid in the above factor to provide an acceptable surgical site for successful placement of the dental implant. Most importantly when planning immediate molar implant placement, removal of the intra-alveolar septum should be avoided to aid in increasing bone to implant contact which in turn helps in attaining of initial implant stability at the time of placement.

Key Words: immediate, Implant, Premolar, Extraction

INTRODUCTION:

An immediate implant is needed for avoiding another surgery after extraction and is placed in same socket with the help of bone grafts to get primary retention. Bone grafts can also help in overcoming bony defects. Most of the time it is placed

on same visit the extraction was done but sometimes it can be done within two weeks of extraction also. Done in selected case which has been considered the optimal procedure for the following reasons: the natural healing process are mobilized to the maximum, no bone resorption has

taken place yet, drilling is reduced, a number of surgical stages were eliminated, design and construction of prosthesis is simplified, and positive psychological effect on the patient^{1,2}. The second premolar site is common as cavity in adjacent molars affects it and/ or due to cervical abrasion premolars are lost and it is always a challenging task to place implant in 2nd premolar region as mental foramen is close to this region, a variety of malformations of the ridges, the presence of softer bone, and little or no possibility of reinforcement via bicortical stabilization^{3,4}. The implant diameter was smaller than the diameter of the root of the extracted tooth, which might lead to a gap between the implant and the extraction socket wall. Where the distance between the implant and the extraction socket is less than 2mm, one can expect spontaneous bone healing without any need for additional bone grafting procedures^{5,6,7}. Barrier membranes have been developed to allow guided tissue regeneration by the principle of osteopromotion⁸. The material is chemically and biologically inert. Non resorbable and resorbable membranes are available in the market, the non resorbable e-PTFE (Expanded Poly Tetra Floro Ethylene) (Gore-Tex,) remains the most widely used membrane^{9,10,11}

CASE DETAILS:

A 58 year old, nonsmoker lady [Table/Fig. 1] visited the Outpatient department of Dental College Azamgarh and as intraoral examination showed Cervical abrasion in tooth 45. [Table/Fig. 2] so it was scheduled for extraction. No pain or fistula formation was noted.

All the available treatment options were discussed with the patient which involves the endodontic treatment of the tooth, with zirconia crown fabrication; extraction of lower right 1st premolar, followed by a delayed implant placement; extraction of lower right 1st premolar and fabrication of a metal ceramic bridge and an immediate implant placement. The patient opted for immediate implant placement and was informed about the treatment procedure.

. Investigations were done to know the following required criteria before undergoing treatment:

- 1) No systemic diseases (e.g. diabetes)
- 2) Not consuming any prescribed medications or recreational drugs.
- 3) The buccal and lingual plate of extraction socket was present. [Table/Fig. 3]

4) The teeth adjacent to the extraction socket were free of overhanging or insufficient restoration margins.

5) The patient was not in practice of using nicotine.

6) The interradicular bone was wide and intact following the tooth extraction.

Lower right 2nd premolar was extracted with the help of periosteal elevator. The socket was curetted carefully and irrigated with sterile saline solution. The dimension of the socket was measured with a periodontal probe (UNC 15, Hu Friedy, Germany) during surgery after tooth extraction. The mesiodistal distance was 5 mm, buccolingual distance was 7 mm. A dental implant 3.8 mm wide, length 13.5 (ADIN, Israel) was placed. Pilot drill (2mm) was used for initial preparation. This was followed by sequential drilling along the implant axial line to allow the implant to have adequate bone contact till 3.75 mm drill in diameter.

Bone graft was done with the help of AFG and PRF membrane

1. 20 CC of patient's venous blood
2. Divided in to two non-coated vacutainers to obtain autologous fibrin glue (AFG), which will make sticky bone.

3. Two to glass coated test tubes without anticoagulants to obtain Concentrated growth factor (CGF) layer.

4. Centrifuged at 2400-2700 rpm with a rotor turning at alternated and controlled speed for 12 minutes

5. AFG tube removed after 2 minute centrifugation [Table/fig. 4,5]. The non-coated tube shows 2 different layers. The upper layer is AFG layer and red blood cell is collected in bottom layer which will be discarded.

6. AFG layer removed with syringe and mixed with bone.

7. It took 10 minutes to form yellow sticky bone [Table/Fig. 6].

8. Vacant slot is filled with water filled test tube for weight balance

9. Silica coated tube shows three different layers. Platelet poor plasma, fibrin buffy coat layer, and red blood cell layer.

Extraction socket had intact socket walls after extraction. Following placement of the implant, primary stability was good. [Table/Fig. 7, 8]

Implant placement site had good soft tissue architecture preservation at one

week post surgery with no complaints of pain nor discomfort during early postoperative healing period.

After 3 months of healing period Implant achieved successful osseointegration. No implant thread exposure at the end of healing process. The residual peri implant socket spaces were found to be well healed.

Six months postoperative radiograph showed a very good condition of bone around the implant. [Table/Fig. 9]

Architecture of soft tissue was stable and adequate attached gingiva was preserved

throughout the healing period as well as after final prosthesis delivery , resulting in to aesthetically pleasing and biologically sound result. [Table/Fig. 10, 11]

Impression was taken after placing transfer coping [Table/Fig. 12] with addition silicon [Table/Fig. 13]

Screw retained fixed prosthesis (Porcelain fused with metal) was fabricated in lab and was placed over the implant and abutment screw was tightened, teflon tape was put over the abutment screw and was restored with the help of composite. [Table/Fig. 14, 15] High points were checked.

Table —1

Age	Sex	Extracted tooth and Implant placement site	Reason for Extraction	Labial peri implant socket gap distance	Primary Stability	Peri implant socket grafting	Healing period before final prosthesis (in months)
58	F	45	Cervical Abrasion with Pulp Exposure	<2 mm	Good	Sticky Bone with PRF Membrane	6

DISCUSSION:

It has been reported in a several recent publications that implants can be placed in fresh extraction sockets with or without the use of covering membrane or graft materials. It has been suggested that the

implant should be placed into a minimum of 3 mm of solid bone apical to the extraction site.^{14,15}

To achieve initial stability of the implant which is a main factor determining the success of immediate placement, the

extraction site must be evaluated to see whether it is suitable for immediate implant placement prior to surgery. Micro movements between implant and surrounding bone must be avoided to allow successful healing to occur. In this case to avoid movements Sticky bone graft was used and it was covered with Plasma rich fibrin membrane (PRF) to get growth factor for faster healing.

Other selection criteria included the following:

A. No clinical signs of acute periodontal or endodontic abscess formation

B. Healthy periodontal conditions before surgery was established and patient was instructed to maintain oral hygiene.

C. Management of postoperative maintenance

D. Patient compliance.

The surgical protocol was standardized and tooth was extracted with minimal trauma, resulting in preservation of intact labial wall which in turn was required for soft tissue framing.

There was a slight increase of bone density for implant through follow-up period in the present study.

For a successful immediate implant placement;

A. case should only be attempted if there is complete resolution of local infection

B. For an appropriately sized implant there should be enough bone for placement in the ideal restorative position, and with primary implant stability.

If there is infection in implant site it can adversely affect the Implant placement and other factors affecting are lack of soft-tissue closure, flap dehiscence, thin tissue types, and incompatibility between the implant shape and the socket.

RESULTS:

POST – LOADING EVALUATION

This was done one, three and six months post loading as implant mobility was tested using the Miller Mobility Index (MI) scores¹¹.

Probing depth¹² was measured for implant for the four surfaces collectively (buccal , lingual , mesial and distal). There was gradual decrease in probing depth measurement during the study period.

Bleeding index¹² was measured from the four surfaces collectively around implant abutment. Bleeding index showed gradual decline over 6 weeks follow up.

Gingival index¹² scores were measured of the four surfaces collectively for all implant abutments. At six months

follow up period, decline in gingival index score was shown.

CONCLUSION:

Pros

Avoid additional surgery

Shortened treatment time

Decreased Period of edentulism

Preserve hard and soft tissues

Psychological benefit

Cons

Risk for higher implant failure

Unpredictable hard and soft tissue levels

Difficult implant stability

Bone graft/membrane often needed

Table- 2

Immediate V/S Early V/S Delayed¹³

Timing	At extraction	2-4 wk after extraction	4-6 months after extraction
No. of surgery(2= stage approach)	2	3	3
Antibiotics	Required	Often required	Not required
Implant stability	Challenging	Can be challenging	Not an issue
Bone resorption	Less (?)	Less (?)	More
Soft tissue profile	More residual	Initial soft tissue coverage is there	More demand for additional soft tissue coverage
Other additional treatment	Bone graft or membrane often needed	Bone graft or membrane often needed	Less bone graft or membrane is required

REFERENCES:

1. Zahnmed SM: Prevention of alveolar ridge resorption after teeth extraction. *Int J Oral Maxillofac Surg.* 114: 328, 2004.
2. Esposito M, Grusovin MG, Kwan S, Worthington H V, Coulthard P: Intervention for replacing missing teeth: bone augmentation techniques for dental implant treatment. *Aust Dent J.* 70: 54, 2009.
3. Abubaker O, Benson K: *Oral and Maxillofacial secrets*, Hanley ,Beflusinc ; Philadelphia. PP 309, 2000.
4. Coatoam G, Mariotti A: Immediate placement of anatomically shaped dental Implants. *J Oral Implantol.* 26:170, 2000.
5. Chen ST, Darby IB, Reynolds EC, Clement JG. Immediate implant placement postextraction without flap elevation. *J Periodontol.*80 : 163-172, 2009
6. McAllister BS, Haghghat K. Bone augmentation techniques. *J Periodontol.*78 : 377-396, 2007.
7. Fugazzotto PA. Report of 302 consecutive ridge augmentation procedures : technical considerations and clinical results . *Int J Oral Maxillofac Implants.* 1998 ; 13 : 358-368.
8. Osteopromotion: A Soft-Tissue Exclusion Principle Using a Membrane for Bone Healing and Bone Neogenesis* Anders Linde, PerAlberius, ChristerDahlin, Kerstin Bjurstam, and Yvonne Sundin *JPeriodont* 1993; 64:1116-1128
9. Simon M, Trisi P, Piattelli A: Vertical ridge augmentation using a membrane technique associated with osseointegrated, implants. *Int J Periodont Rest Dent.* 14: 497, 1994.
10. Rominge J W, Triplett R G: The use of guided tissue regeneration to improve implant osseointegration. *J Oral Maxillofac Surg.* 52:106,1994.
11. Schliephake H, Dard M, Planck H, Hierlemann H, Jakob A.: Guided bone regeneration around endosseous implants using a resorbable membrane VS ePTFE membrane . *Clin.Oral Impl .Res:*11:230, 2000.
12. Miller SC. *Textbook of Periodontia.* 3rd Edition, Blankiston Inc. Pub, Philadelphia. Pg 215, 1950.
13. Esposito M, Grusovin MG et al. The effectiveness of immediate, early and

conventional loading of dental implants : A Cochrane systematic review of randomized controlled clinical trials. Int J Oral Maxillofac Implants. 2007; 22 : 893- 904.

14. Schwartz AD, Chaushu G. The ways and wherefores of immediate placement of implants into fresh

extraction sites : A literature review. J Periodontol.1997 ;68:915-923. [15]. Werbit MJ , Goldberg PV. The immediate implant: Bone preservation and bone regeneration. Int J Periodontics Restorative Dent. 1992;12:207-217.

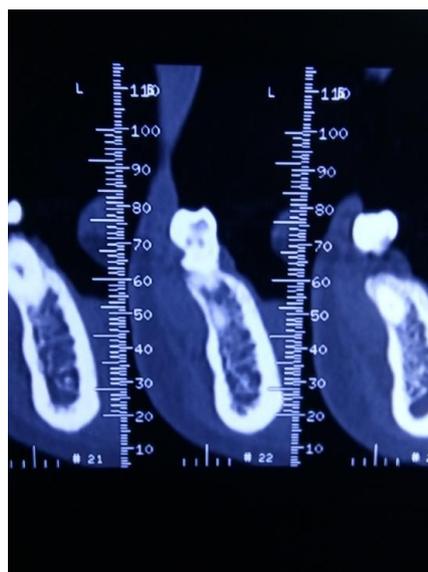
FIGURES:



Table/Fig. 1



Table/Fig. 2



Table/Fig. 3



Table/Fig. 4

Table/Fig. 5



Table/Fig. 6

Table/Fig. 7



Table/Fig. 8

Table/Fig. 9



Table/Fig. 10



Table/Fig. 11



Table/Fig. 12



Table/Fig. 13



Table/Fig. 14



Table/ Fig. 15