Immediate Implant Placement in Mandibular Esthetic Zone: A Clinical Report

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Abstract

In the past two decades' immediate dental implant placement has been considered satisfactory treatment modality. The dental implants can be placed in the fresh extraction sites by simultaneous use of bone graft material. The patient was suggested to go for a treatment procedure for the extraction of and immediate implant therapy. A bonegraft material was used to fill the space between the implant and the sockets along with planning a two-stage surgical procedure to optimize bone healing. When the osseointegration was complete abutment connection was placed with no complications radiographically examination showed a slight marginal bone reduction after 6months of follow-up. The immediate placement of implants helps in preserving the form and contours of the hard and soft tissues, by decreasing the necessity augmentation procedure. It also helps in minimizing the surgical exposure of the patient, reducing the treatment time and also improves the esthetic outcomes.

Keywords: *Immediate Implant Placement; Mandibular Esthetic Zone; Treatment option.*

Introduction

In general, the extraction of teeth often leads to resorption of alveolar bone. The immediate implant placement at the site of extraction might add to the preservation of the alveolar bone during the procedure and also helps in reducing the healing time.[1] The bone-to-implant might be enhanced by the bone-forming activity in comparison to implants placed in a less osteogenic active-site.[2] The early implant placement may result in favorable implant crown ratio, improved esthetics along with preservation of the alveolar structure, and the positioning of implant-fixture in a fresh extraction socket enables in maintaining the bony crest.[2]

According to literature preceding tooth extraction, the predictable loss of alveolar bone is accelerated in the first six months with as much as 40% of the alveolar height and 60% of the alveolar width loss, continuing at a rate of 0.25% to 0.5% per year.[3]As thisresorption of the alveolar ridge has been an inevitable event followed by extraction of a tooth, to prevent this conventional guidelines in the late 1980s advises 8 weeks of socket healing and for remodeling additional 3-6 months of load-free healing, which was believed to be necessaryfor osseointegration.[3,4]There are various advantages of immediate implant placement such as crestal bone preservation, reduction in complex surgical procedures, minimizing the edentulous period, and better patient acceptance.

Simultaneously, the guided bone regeneration (GBR) procedures, that usebone grafts and collagen membranes, are frequently essential in such situations

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to correct the peri-implant defects and/or to augment surrounding tissues.[3]

The loss of mandibular incisors is most likely to be frequent maybe because of caries or periodontal diseases.[5] The replacement of such incisors by immediately placed implants is a straightforward, predictable, and minimally invasive procedure. The purpose of this article is to present a case of periodontally compromised anterior teeth associated with bone loss using immediate implant placement combined with simultaneous GBR to correct the defect.

Case report and technique: A 52-year-old female was reported to the department of prosthodontics with localized advanced periodontal disease including mandibular incisors; 32 and 42 exhibiting Class II mobility due to bone loss (Figure 1a). The aesthetic requirement of the patient has been a major concern due to the loss of mandibular central incisors and a mild discomfort on biting due to the mobility of lateral incisors. Medical history was noncontributory. Various treatment alternatives including removable prosthesis, resin-bonded bridge, conventional fixed prosthesis, and implant-supported fixed prosthesis procedures were discussed with the patient. The patient was not willing for a removable partial denture or any interim prosthesis. Based on the patient's desire for a reduced the number of surgical procedures and overall treatment time, immediate implant placement after tooth extraction of 32 and 42 was decided as the final treatment plan.

For the placement of the implant, an adequacy in the volume of bone was determined by the clinical and radiographic examinations. The treatment choice would be the extraction of the tooth nos. 32 and 42 preceding immediate placement of two implants. Postoperative instructions provided include a soft diet for the first six to eight weeks followed by surgery. Informed consent was obtained. Before proceeding into the surgical phase, a diagnostic impression of the maxillary and mandibular arch was made from alginate material along with a bite registration. The diagnostic casts were articulated at the proper intercuspation position and a diagnostic mockup was done to determine the position and the final aesthetic outcome of the implant-supported fixed prosthesis.

The surgical phase was initiated with the administration of local anesthesia (lidocaine with epinephrine 1:100,000), extractions of teeth No. 32 and 42 were performed (Figure 1b, 2a). The desired implant positions to be placed were determined based onthe diagnostic wax-upsurgical guide was fabricated for proper implant placement. Osteotomies were performed to gain access through the site of the extraction socket[5] (Figure 2b). The drilling process progressively ensures the increase in the socket diameter with the utmost use of apical bone to the extraction socket. For the duration of the drilling procedure a finger was placed over the thin buccal mucosa, facilitating close approximation with the labial bone plate, consequently preventing perforation of the bone. Socket curettage was done before the placement of implants.[6] An implant (myriad plus measuring 3.5 mmx13 mm) were placed in 32 and 42 positions (Figure 3a). The implants were placed parallel to the incisal edge of the adjacent tooth with a lingual inclination. Implants were screwed properly into the alveolar bone unless the threads of the implant completely embedded into the alveolar bone and the collar in alignment with the crestal bone. Evaluation of the primary stability of the implants can be verified when there is an absence of rotation on the application of a reverse torque of less than 20N-cm. The snug fit of the implant ensures the prevention of mobility. The clinical stability of implants can be determined by palpation and percussion.[7] Adequate initial stability was obtained when placed with a torque driver at 35 Ncm.[2]A minimum distance of 3mm from the adjacent CEJ was maintained to achieve a normal emergence profile. A localized Guided Bone Regeneration procedure was then undertaken using bone grafts (biooss) along with (platelet-rich fibrin) barrier membrane, followed by placement of interrupted sutures to enable maximum approximation of the soft tissues to the abutment(Figure 3a) This platelet-rich fibrin membrane enhances stability is immediately placed implants when used in guided bone regeneration.[8] The patient was then instructed to follow a intake of soft diet consisting of high nutrient value and postoperative medications like Augmentin and zerodol SP and Pantop D advised for 5 to 7 days, along with a mouth wash, chlorhexidine gluconate (0.2%) twice a day for a week.[9] The patient was recalled for the postoperative follow up for suture removal after a week following the surgery and then called for subsequent follow-ups at their month, six months, and twelve-month respectively.

The stability of the implant was evaluated by tactile perception and fremitus test while the gingival inflammation was evaluated by noninvasive gingival index using Modified Gingival Index (MGI).[6]

The patient was recalled after 3 months for follow-up. Second stage surgery was done and the gingival former was placed (Figure 3b, 4a). After a 2week prosthetic phase was performed in which the gingival formers were replaced with abutments and the final impression was made with polyvinyl siloxane material (Figure 4b). The lab analogs are then placed upon the abutments and sent to the laboratory for the fabrication of the permanent fixed ceramic-metal Fixed prosthesis. After a week metal trying was done followed by loading of the 4unit prosthesis (Figure 5a) Implant protected occlusion was designed to improve the longevity of the prosthesis with adequate aesthetic outcomes. The six-month follow-up examination revealed stable, healthy peri-implant soft tissue with no signs of complications and clinical modifications in soft or hard tissue levels.[10] The patient was also satisfied with the esthetic and functional outcome (Figure 5b).

Figure 1a. Preoperative Anterior mandibular incisors; Figure 2b. Teeth after surgical extraction

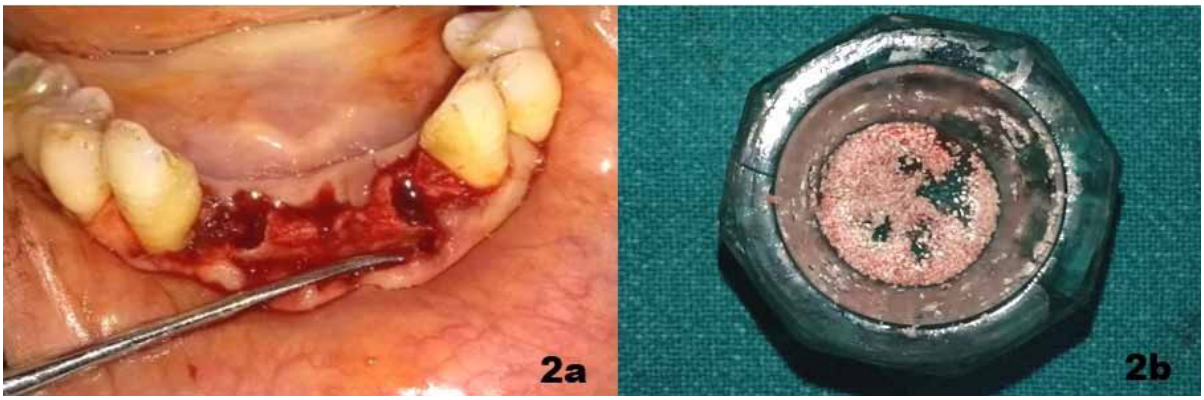

Figure 2a Periosteal Flap raised after extraction; Figure 2b. Biooss bone with collagen membrane

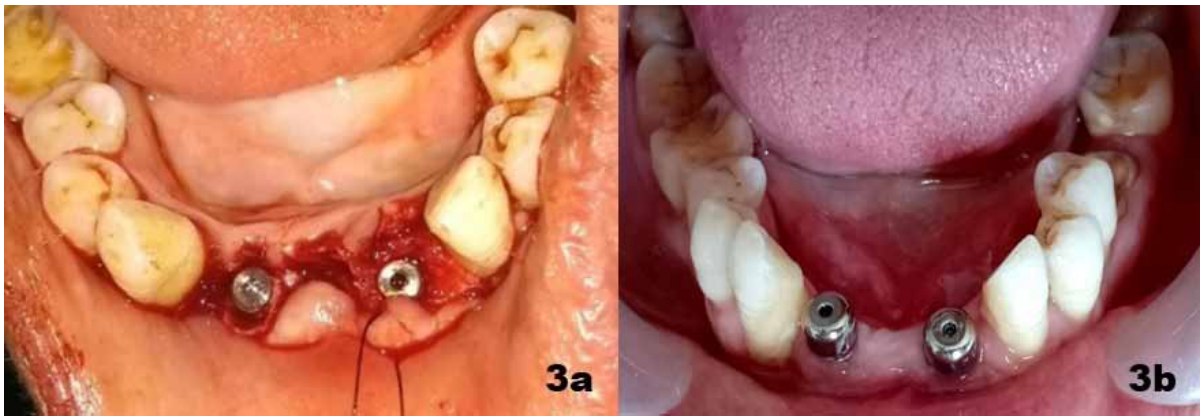

Figure 3a Graft placed and sutured; Figure 3b. Attachment of permucosal extensions

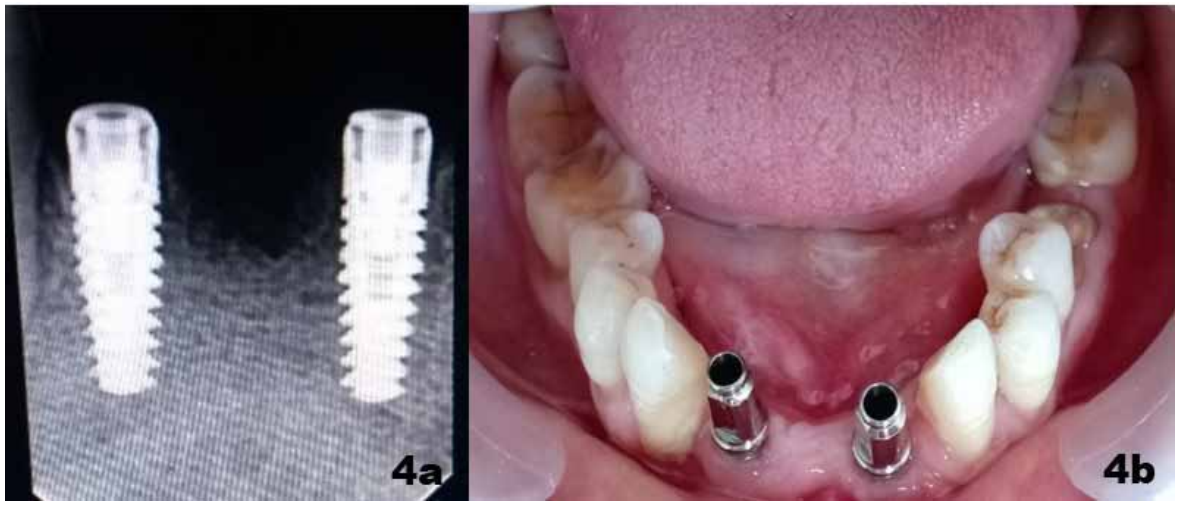

Figure 4a Implants after 3month of placement; Figure 4b Abutment connected to implants

Figure 5a Four unit fixed prosthesis; Figure 5b Implant prosthesis under implant protected occlusion

Discussion

According to Macheti et al in periodontally susceptible patients the rate of survival of immediately placed implants is similar to that of no susceptible patients. For immediate implant placement the anterior mandible proves to be a favorable site for reasons like adequate bone quantity and quality, narrower and shorter tooth sockets than the osteotomy which helps in stabilization of bone beyond the sockets.[9] In anterior mandibular site there is less potential of nerve damage as the inferior alveolar nerve doesnot course in between the mandibular foramina.

The patient was advised to keep caution while eating and instructed to avoid biting with the restoration for at least 4 weeks.

According to literature it has been shown that within a period of three to twelve months most of the major changes occur following tooth extraction with an estimated demonstration of 50% reduction in the buccolingual width. Immediate implant placement following tooth extraction eliminates the socket healing period and thus reduces the occurrence of alveolar bone resorption.[11, 12]

It has been documented that using barrier membrane and different graft material fills the residual peri-implant defects for enhancing the peri-implant bone healing and to achieve a final aesthetic outcome. These barrier membranes may also help in preventing the invasion of connective tissues and the epithelium into the microgappresent in-between the implant and the surrounding bony walls, which ultimately favors bone regeneration.[8] The bone grafts can moreover acts as a spacemaintainer moreover promoting bone formation that can eventually provide better osseointegration.

Conclusion

Based on the literature review, the universally applicable defined criteria for implant success adopted from Bursar et al were the absence of persistent

infection, gingival inflammation, implant mobility, peri-implant radiolucency neurologic signs and symptoms.[15] According to the present report and its outcome, it can be concluded that immediate implant placement may be considered as a viable treatment modality as the treatment protocol showed reduced clinical time in situations that allow an aesthetic outcome. It significantly showed high survival rates that can be achieved with the implants placed in immediate extraction sockets.

Conflict of Interests: None

Ethical Permission: Approved

Funding: Nil

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