

Immediate placement of implant in fresh extraction socket with early loading

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Abstract

Implant placement in maxillary anterior region has most aesthetic challenges in implant dentistry because tooth loss lead to bone resorption and collapse of gingival architecture, which lead to aesthetic compromise and inadequate bone for implant placement. Immediate implant placement into fresh extraction socket reduces the treatment time, cost, preserved the gingival aesthetic and increases the comfort of the patient. This article describes the procedure for immediate implant placement in fresh extraction socket and early loading of implant with zirconia crown. Clinical and radiographic examination revealed width and length of the tooth for selecting implant size and design. Cement retained zirconia crown was used for early loading. Implant was successfully loaded and was functional during 36 months follow up period. Immediate placement and early loading of dental implant provides advantages like fewer surgical procedures, shorter treatment time, and improved aesthetic and psychological confidence.

Keywords: Early loading, fresh extraction socket, and gingival architecture immediate placement

Introduction

Loss of tooth in the aesthetic zone is a traumatic experience with or without compromise in phonetics. Hence, in the aesthetic zone implant supported single tooth replacement is one of the most challenging situations confronting the clinician.

According to the traditional protocols 3-4 months of healing period is required for the consolidation of extraction socket. Taking into account the prosthetic treatment, patients frequently are required to wait up to 1 year for replacement of a lost tooth.^[1]

Attempts to shorten the overall length of treatment period have focussed on approaches like early or immediate loading following implant placement, immediate implant placement in fresh extraction site, and immediate implant placement and early or immediate loading.^[2-4]

The concept of immediate implant loading has recently become popular due to less trauma, reduction in overall treatment time, decrease in hard and soft tissue resorption,

increase in patient's acceptance, along with better function, aesthetics and has a psychological benefit also.^[5,6] In this case report the harmony of soft and hard tissue was preserved by immediate implant placement and early loading in anterior maxilla.

Case Report

A 20 year old male patient presented to the Department of Prosthodontics, Banaras Hindu University with chief complaint of fractured upper front teeth due to trauma. Clinical and radiographic examination revealed fractured tooth with unfavourable prognosis [Figure 1]. The patient was given a detailed explanation concerning the present state, alternative treatment plans and the proposed procedure which included immediate implant placement and early loading. The patient was very conscious about his aesthetic and was very keen for earliest possible restoration of his teeth and so he opted for proposed procedure.

Pre-surgical radiographic evaluation was carried out with IOPA, panoramic radiograph and CT Dentascan [Figure 2] for appropriate treatment planning. In CT Dentascan diameter of the socket 1mm apical to crestal bone was 5 mm and length of the socket was 10.5 mm.

After proper treatment planning endo-osseous implant (Hi-Tec tapered self threaded, Life Care Devices Private Limited, Isreal) measuring 5 × 13 mm in dimension was selected. Following an injection of 2% lidocaine with 1: 100,000 epinephrine local anaesthetics, the fracture tooth was atraumatically removed [Figure 3]. The resulting extraction socket was evaluated for osseous defects. All four walls were found intact. The extraction socket was thoroughly debrided and after sequential drilling implant was placed in socket with the insertion torque of 45 Ncm [Figure 4]. Implant first thread was placed 1.5 mm apical to crestal bone

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Access this article online	
Quick Response Code:	Website: www.contempclindent.org
	DOI: 10.4103/0976-237X.101099



Figure 1: Pre-operative occlusal view of fractured maxillary left central incisor

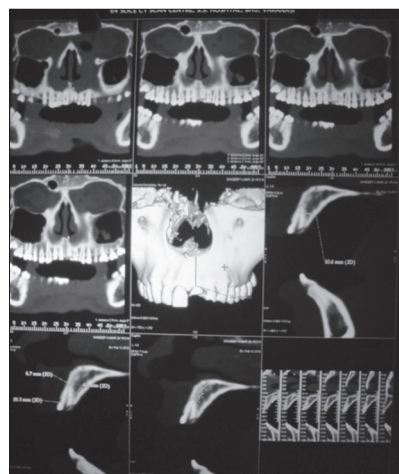


Figure 2: Pre-operative CT Dentascan showing sub gingival fracture in maxillary left central incisor and computed tomogram viewed before operation

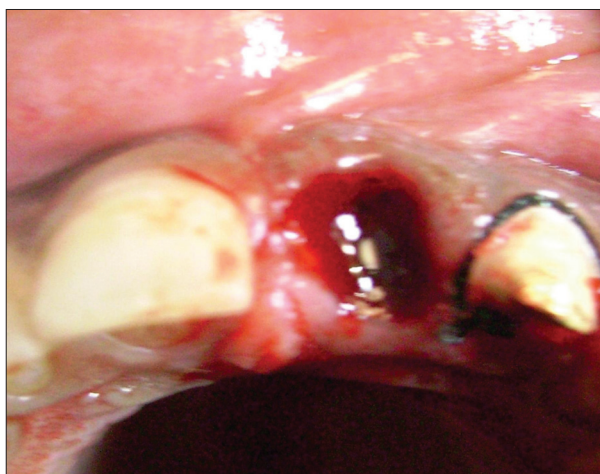


Figure 3: Atraumatic tooth extraction without flap reflection resulted in well preserved bone and soft tissue architecture



Figure 4: A 5 x 13 mm tapered self-threaded implant (Hi-tech, Lifecare devices private limited, Isreal) was inserted to desired depth after sequential osteotomy

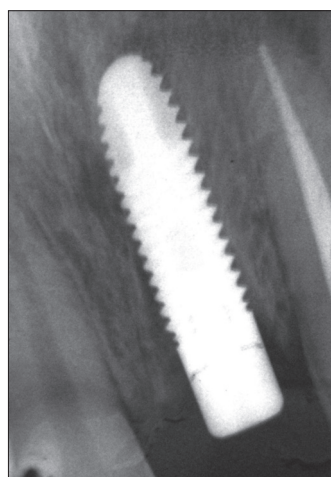


Figure 5: Periapical radiograph after implant surgery

of the socket and adequate primary stability was obtained. Post-operative periapical radiograph was taken [Figure 5] Impression is made by open window tray technique using



Figure 6: The definitive customized abutment with corresponding gingival emergence were tightened to 35 Ncm torque



Figure 7: Labial view of definitive implant zirconia restoration. Note- The preservation of tissue architecture and minimal trauma to surrounding tissue

vinyl polysiloxane impression material (Aquasil, Dentsply/Caulk, Milford, DE). Healing cap (Hi-Tec HC-3 gingival former Life Care Device Private limited, Isreal) was secured on the implant. Appropriate antibiotic (amoxicillin 500 mg, 3 times daily for 7 days) and analgesic (ibuprofen 800 mg, every 4 to 6 hours as needed) were prescribed and post operative instructions were given. The impression was poured with type-IV stone (Ultrarock, Kalabhai Karson Pvt.Ltd., Mumbai). The master cast obtained was mounted on a semi adjustable articulator. The abutment was prepared outside the mouth on the working cast. The working cast was then sent to laboratory for fabrication of CERCON® Zirconia crown (Dentsply Ceramco, York, PA).

After 2 weeks of healing period, the implant was loaded with cement retained Zirconia crown [Figures 6, 7]. Follow up was done at 6, 12, 18 and 36 months subsequently [Figure 8].

Discussion

Immediate implant and early loading may be a good treatment option in the loss of anterior teeth.^[4] Its success rate in maxilla is 66%-95.5% and in mandible 90%-100%.^[7]

Immediate implant placement is most commonly indicated when tooth extraction is due to trauma, endodontic lesion, root fracture, root resorption, root perforation, unfavourable crown to root ratio (not due to periodontal loss) and bony walls of alveolus are still intact.^[8] Contraindications includes presence of active infection, insufficient bone (<3 mm) beyond the tooth socket apex for initial implant stability and wide and/or long gingival recession.

Prior to extraction of tooth it was aesthetically evaluated to comprehensively assess the potential implant placement site. A proper plan was made which included soft tissue treatment protocol and set of well defined aesthetic goals. Under three

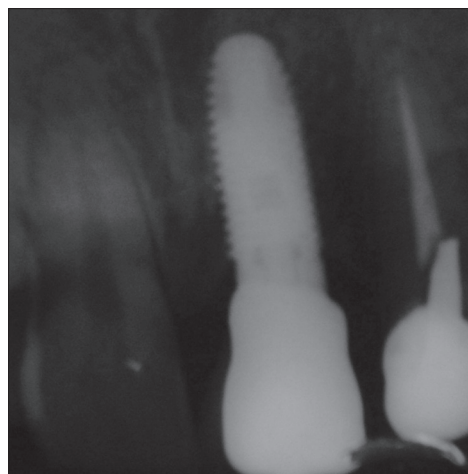


Figure 8: IOPA 3 year after the implant surgery

parameters the prospective implant site was evaluated to predict the peri-implant aesthetic outcome these are tooth position and shape, form and bio-type of the periodontium and position of osseous crest.^[9]

The surgeon may wish to consider loading the newly placed implant immediately or early when anyone of the following condition exist at implant site: when primary stability is obtained, bone is type I or II, site can accommodate implant with a length of at least 13 mm or minimum 3 mm of apical bone present, diameter of the head of the implant closely matches the mesio-distal width of coronal aspect of the socket, no need for bone augmentation procedure, once placed the implant can be completely protected from function and occlusal forces.^[10]

The initial stability of the implant is essential for early/immediate loading. The minimum insertion screw has to be equal or superior to 32 N/cm and the micro movement of the implant should not exceed 150 μ m. Bruxism and the lack of primary stability of the implants are contraindications for the immediate loading.^[7,11] In this case report, primary stability was achieved and no need for bone augmentation because the implant diameter closely matches the socket dimension.

Immediate/early loading of implant requires an understanding of the biology of the recipient tissue, the surgical trauma, the wound healing process and occlusion. Wound healing studies have demonstrated that early osteoid formation begins after 7 day, mineralization commences at 21 days thus implant loading after 2-3 weeks may therefore turn into a feasible protocol.^[12] In this case report implant is loaded after 2 week and during 3 year of follow-up there is minimum bone loss occur.

Dental implants that are immediately placed and loaded into carefully selected extraction socket have high survival rates comparable to implant placed in healed site.^[5]

In this case report we are pleased with the gingival aesthetic.

Studies have confirmed that immediate loading will produce excellent gingival aesthetics. Although in this study only two patient visits were needed to achieve this result, our real goal is to show the potential to reduce time and improve patient satisfaction.

Conclusion

This case report demonstrates that it is possible to achieve greater efficiency in our efforts to give patient sound, timely and economical treatment. This procedure is still technique sensitive, but it is clear that with continued innovation in the prosthetic capabilities of implant system we should be able to enhance the service and treatment offered to our patients in regard to our treatment time, patient comfort, cost and aesthetics.

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How to cite this article: Singh A, Gupta A, Yadav A, Chaturvedi TP, Bhatnagar A, Singh BP. Immediate placement of implant in fresh extraction socket with early loading. *Contemp Clin Dent* 2012;3:S219-22.

Source of Support: Nil. **Conflict of Interest:** None declared.