

Case report

Immediate implant placement with immediate loading- A case report

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Abstract

Dental implants have provided an excellent treatment option to restore edentulous spaces. Successful formation of a direct bone to implant interface is the goal in implant therapy. Immediate loading is an alternative to the two-stage surgical procedure. Improved surgical instrumentation, implant design and surface topography, changes the concept of a two-stage surgical procedure to a one stage procedure. Early and immediate loading of dental implants can significantly decrease the treatment time and thus result in an increase in patients' comfort. This case report describes the placement of implants in fresh extraction sockets in the mandibular anterior region and immediately loading them with a provisional bridge.

Keywords: Implants, surgical procedure, bone, edentulous spaces

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Introduction

Dental Implants have been one of the most utilized treatment options of modern dentistry. The advancement attempts made in implant dentistry from its infancy have been aimed at providing success in three main aspects – functional stability, biological stability and esthetics.¹ Healing following a tooth extraction often leads to alveolar bone atrophy.² Changes in the alveolar bone dimension are more pronounced during the first six months of extraction followed by a slow resorption rate thereafter.³ Immediate implant placement helps to prevent this post extraction alveolar atrophy.⁴ The concept of placement of an implant immediately in fresh extraction socket was described by Schulte and Heimke in 1976, however recently this concept has been explored and utilized more often.⁵ This concept also has the added advantage of reducing the number of surgical steps, treatment time and preserving the alveolar bone and facilitating better esthetic outcomes.⁶ However, this treatment concept cannot be applied to all dental implant cases but only to cases where it is indicated. Another additive to this concept of immediate implant placement is immediate loading which refers to the immediate prosthetic loading: the placement of a temporary restoration immediately after the insertion of the fixture (within 48–72 hours after surgery). This approach provides an aesthetic benefit to the patient, who can avoid wearing uncomfortable removable dentures during the healing period. The placement of an immediate provisional restoration also provides better esthetics with respect to gingival tissues, which can be modeled around it immediately.⁷

The following case report describes a case of immediate implant placement along with immediate loading using provisional restoration.

Case – report

A 32-year old healthy male patient presented to the dental clinic with the chief complaint of mobility in his lower front tooth region. Patient's medical history was non-contributory. He had noticed the mobility since past 3 months and reported an increase in it over these months. On clinical examination, there was presence of plaque and calculus (score of 2). Grade III mobility with relation to 31,32,41,42 was seen. Miller's class III gingival recession with respect to 31,32,41,42 (Figure 1). There were generalized probing pocket depths of 4 to 6mm. Trauma from occlusion was absent. Temporomandibular disorders or parafunctional habits were absent. Radiographic examination revealed extensive bone loss with respect to 31,32,41,42. A diagnosis of generalized chronic periodontitis was made based on clinical and radiographic findings. After appropriate treatment planning, immediate implant placement with respect to 42 and 32 using endo-osseous self-tapered root form implant (Myraid, Equinox, Netherlands) in phase two of the treatment plan was planned. Patient had also insisted about his esthetics after implant placement. Hence, considering the patient's need, an immediate temporization of the implants was also planned in the same visit.

Pre-surgical radiographic evaluation was carried out with radiovisiography (RVG), panoramic radiograph for appropriate treatment planning (Figure 2).

Systemic examination of the patient revealed no abnormality and routine blood investigations were carried out to exclude any complications.



Figure 1: Pre-operative implant site



Figure 2: intraoral periapical radiograph of lower incisors

The pre-operative clinical and radiological examinations were undertaken for assessing the length of existing retained root in order to determine the length of future implant and width of socket. Before proceeding with the implant placement, the patient signed an informed consent form. The surgical procedure for immediate implant placement began with the administration of the nerve block in the treatment area using 2 percent lignocaine with adrenaline 1:80000 (Lignox 2% A, Indoco Remedies Ltd, Mumbai, India) to anesthetize the surgical site. A sulcular incision was given using no.15 blade and a full thickness mucoperiosteal flap was raised (Figure 3).



Figure 3 - Sulcular Incision given



Figure 4 - Extraction of 31, 32, 41
42

Following which 31,32,41,42 were extracted atraumatically using a periostome and periosteal elevator (Figure 4). The resultant extraction socket was checked for any osseous defects. All four walls of the extraction socket were found to be intact. The socket was cleaned of any granulation tissue present (Figure 5).



Figure 5 –Resultant extraction sockets Figure 6 - Following implant placement

The osteotomy procedure was initiated using the pilot drill engaging the apical bone in the socket and an IOPA was taken with the paralleling pin to check for the implant angulation (parallelism) in the region of 32 and 42. Sequential

drills were then used as per the implant system guidelines to place an implant of 3.3 X 13mm (Myraid, Equinox, Netherlands) in the region of 32 and 42 and an implant insertion torque of 35N was achieved manually (Figure 6). Standard straight implant abutments were placed (Figure 7).

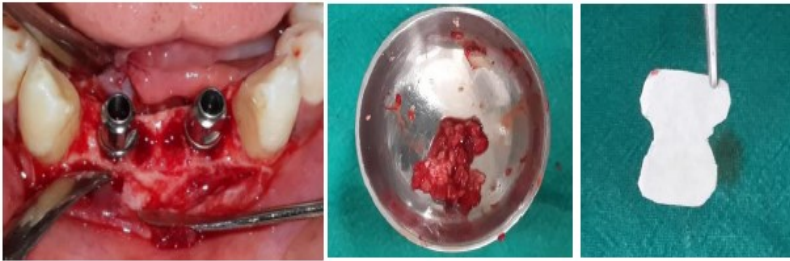


Figure 7-Straight Abutments placed & Autogenous bone graft and demineralized bone graft for socket grafting with respect to 31, 41 & collagen membrane

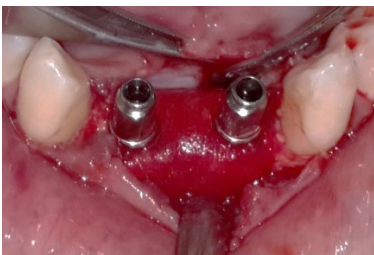


Figure 8 - Grafting done and GTR barrier membrane placed



Figure 9 - Sutures given

The resultant sockets of 31 and 41 were grafted using demineralized bone allograft and autogenous bone graft and bioresorbable collagen GTR membrane (Bio-Guide, Geistlich Pharma AG, Wolhusen, Switzerland) was placed (Figure 7). Simple interrupted sutures were placed using 3-0 silk suture

to approximate the flap (Figure 8,9). For immediate temporization, an elastomeric impression was made. An acrylic provisional bridge was fabricated and cemented in the same appointment (Figure 10).



Figure 10- Two weeks post-operative Figure 11 - Final prosthesis placed

Care was taken to prevent any incisal contact of the provisional prosthesis during centric or lateral excursive moments. Post-operatively, an antibiotic (amoxiclav 625 mg, 2 times daily for 5 days) and an analgesic (ibuprofen 400 mg, every 8 hourly for 3 days) were prescribed and post-operative instructions were given. 0.12% chlorhexidine gluconate mouthwash was prescribed for 7 days post-operatively. Patient was advised not to bite using the temporary prosthesis for 6-8 weeks and was asked to report back after 7 days for suture removal. The acrylic provisional prosthesis was replaced by porcelain fused metal crown after the fourth month follow-up showed good soft tissue contours clinically and hard tissue stabilization radiographically (Figure 11).

Discussion

Immediate implant placement with immediate loading is one of the most popular treatment options in implant dentistry. However, for its success it is vital to consider various factors like socket anatomy, implant positioning, jumping distance, type of provisional restoration.⁸

The pre-operative factors affecting the outcome of immediate implant placement is the socket anatomy, presence or absence of infection at the site and gingival biotype.

Type I socket described by Ellen and Tarnow⁹ is the ideal socket type for immediate implant placement, which was also present in this case (figure 5).

A systematic review by Lee *et. al.* stated that implants can be placed in infected extraction sockets after thorough socket debridement. However, to achieve good aesthetic outcomes the width of keratinized gingiva should be considered while attempting immediate implant placement in infected sites.¹⁰

Another approach which can be utilized while placing immediate implant is use of flapless surgery which provides the added advantage of improved esthetic outcomes and less soft and hard tissue loss due to its minimal invasive property. However, when in doubt regarding the space between the implant fixture and socket wall referred as jumping distance, raising a flap is always advisable. A randomized controlled trial by Jane *et al.* concluded that both flap and flapless procedures have high success in implant dentistry. However, while attempting a flapless technique patient must be properly selected.¹¹

Various studies suggest that if the jumping distance is less than 2 mm, then no regenerative therapy is needed for filling this gap. If, however the distance is more than 2 mm, then it is recommended to use a regenerative therapy using bone graft and GTR membrane which requires raising of a full thickness mucoperiosteal flap as done in this case.¹²

The finishing of the provisional restoration also plays an important role to achieve good soft tissue contours post healing. The contours and optimum polishing are one among the important factors to be considered while designing a provisional restoration.

To achieve predictable and desirable outcomes with immediate implant protocols, it is important to adhere to advanced surgical skills, ideal extraction socket conditions and knowledge of local anatomy.¹³ It is recommended that when ideal conditions are not present, other implant placement timing protocols that provide good clinical outcomes with regards to soft and hard tissues be followed.

Conclusion:

Appropriate surgical treatment, restorative procedures, and clinical experience are essential when performing immediate placement of implants with immediate loading. Immediate implant placement following tooth extraction might be a viable alternative to delayed implant placement. However, it requires careful case selection and a specific treatment protocol, proper case

selection, diagnosis and treatment planning, meticulous post-operative care preceded by a good surgical and prosthetic protocol to ensure the long-term success of the immediate implants. Also, it should not be used as a universal approach but only in cases where the outcomes can be predicted.

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