

IMMEDIATE IMPLANT PLACEMENT IN AESTHETIC ZONE: CRAFTING SMILE WITH AN INNOVATIVE APPROACH

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ABSTRACT

Immediate implant placement is most commonly indicated when tooth extraction is performed owing to pathologies such as unrestorable caries or fractures. The primary advantage of this treatment modality is the diminution of healing time and reduced alveolar process resorption. Regenerative materials can be used as an adjunct with implants in order to triumph high implant survival rate and enrich good esthetic outcome. This case report illustrates treatment protocol and one-year clinical follow-up of a patient who underwent atraumatic extraction of his fractured mandibular central incisor, followed by immediate implant placement with bone grafts.

KEYWORDS

Atraumatic extraction, Esthetics, Immediate implant

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INTRODUCTION

Advanced periodontitis, unrestorable caries and fractures are the most common reasons for tooth extraction, where resorption of alveolar bone can be perceived.¹ Replacement of missing teeth in anterior segment with removable prosthesis and fixed partial dentures can compromise patient's esthetic and psychological ultimatums.¹ In order to circumvent the problem of post-extraction resorption and fulfill patient's need, the concept of immediate implants was proposed in the late 1970s. Immediate implants are defined as the placement of implants in the course of surgical extraction of the teeth to be replaced.² Their role was evidenced in various clinical studies for preserving crestal bone with high degree of osseointegration and excellent survival rate.^{3,4} The intention of this article is to present a case of fractured mandibular anterior teeth which was extracted atraumatically, followed by immediate implant placement with bone grafts and followed up for a year without any complications.

CASE REPORT

A 28 year old male patient reported to the Department of Periodontology and Oral Implantology of Universal College of Medical Sciences, Bhairahawa, Nepal, with the chief complaint of loose tooth in his lower anterior tooth region since two days. Medical history was noncontributory. Intraoral examination findings revealed Ellis Class IV fracture in relation to 31 (FDI Numbering system) with Grade III mobility and having hopeless prognosis. Patient was also diagnosed with chronic generalized marginal gingivitis.

Intra-oral periapical radiographic examination revealed adequate bone, absence of periapical pathology but horizontal fracture line was below the crest of alveolar bone in relation to 31 and was limited to the tooth. Various treatment options were discussed with the patient. Based on patient's desire of reduced number of surgical procedures and overall treatment time, immediate implant placement with bone graft after atraumatic extraction of 31 was decided as the final treatment plan. Written informed consent was acquired from patient.

Diagnostic impressions were taken using alginate hydrocolloid impression material and a study cast model was prepared. Following an initial examination and treatment planning discussion, the patient underwent nonsurgical therapy including scaling and root planing with oral hygiene instruction followed by re evaluation. A complete hemogram depicted values within normal limits.

Subsequently, after two weeks of initial Phase I therapy, surgical therapy was scheduled for the patient. The patient was asked to do a pre-surgical mouth rinse using 2 ml of 0.2% Chlorhexidine solution, and 5% povidone iodine solution was used to perform extra-oral antiseptis. Patients were prepared, draped according to standardized aseptic approach and anaesthetized using 0.2% Lignocaine with adrenaline in concentration of 1:200000 with epinephrine. Intrasulcular and interdental incisions were given with the help of No.12 and No. 11 surgical blades respectively. Full thickness mucoperiosteal flaps was reflected using Molt's

No. 9 periosteal elevator both buccally and lingually to uncover the level of fracture (Figure 1). Consequently, atraumatic tooth extraction with GDC P1 periosteal was performed.



Figure 1. Intra-operative view showing fractured 31 which was deemed unrestorable

The extraction socket was thoroughly debrided with caution to prevent fracture of thin labial plate. ADIN Dental Implant System (AFULA, Israel) was used for replacement of missing teeth. Osteotomy site preparation was carried out initially with Tri-step drill at the speed of 800 rpm, along with copious amount of saline irrigation, to establish the depth and align the long axis of the implant recipient site. Following the Tri-step drill, Pilot drill with diameter of 2 mm was used to broaden the osteotomy site at the coronal end, thus facilitating the insertion of the subsequent drill in the sequence. An implant depth gauge was used to ensure the intact buccal bone plates and thorough curettage was executed to ensure total debridement of infra bony pocket. Likewise, a parallel pin was introduced within the site to check the angulation in the labiolingual direction and mesiodistal direction. Further, drilling was continued in a sequential manner with 2.8 mm, and 3.2 mm drills respectively to incrementally upsurge the width of the osteotomy site. Moreover, drills were repeatedly pumped out of the osteotomy site while drilling to expose them to water coolant and to facilitate clearing bone debris from the cutting surfaces. After the osteotomy, Touareg Close Fit™ Dental Implant (ADIN, Israel) with diameter of 3.5 mm and length of 13 mm was inserted in the extracted site by hand with a wrench (Figure 2). Adequate initial stability was acquired when placed with a torque driver at 35 Ncm. Once the implants are



Figure 2. Immediate implant placement in 31

inserted and the cover screw secured, the surgical sites were thoroughly irrigated with sterile saline to remove debris and clean the wound. SyboGraf™- Plus (combination of Hydroxyapatite and β -Tricalcium phosphate) synthetic bone graft was placed near the implant in order to enrich bone regeneration (Fig 3,4).



Figure 3. Bone graft placed near the implant



Figure 4. Radiographic view after immediate implant placement in relation to 31

Flaps were then approximated and sutured over the cover-screw of implant, using interrupted loop suturing technique with 4-0 silk sutures. The operated site was then protected with periodontal dressing (COE-PAK™ GC America). Postoperative instructions were given to the patients after the procedure. Patient was prescribed capsule Amoxicillin for one week at a dosage of 500 mg three times per day and Tablet Ibuprofen 400 mg three times per day for three days and warm saline rinse (3-4 times/ day for two weeks). As a preventive measure, patient was counselled to apply cold packs over the first 22 to 48 hours. To abate traumatic injury to the wound, toothbrushing was avoided over the pack for the first week. Chlorhexidine mouthrinse 0.2% (10ml) was prescribed two times daily for two weeks in order to facilitate plaque control. Patient was also instructed to maintain soft diet for few days and gradually return to a normal diet after adequate healing.



Figure 5. After placement of prosthesis in relation to 31

Periodontal dressing and suture removal was done after two weeks postoperatively. Oral hygiene reinforcement, including initial gentle brushing, followed by normal brushing and flossing was advised to the patient. Patient was recalled after five months for second stage surgery where, healing cap was placed. Simultaneously, after two weeks' prosthetic phase was performed. Fixed ceramo metal FP 3 prosthesis was fabricated with gingival ceramics in gingival recession areas. Loading of the prosthesis was done (Figure 5). Gingi-



Figure 6. Postoperative radiographic view after one year follow up

val prosthesis was recommended to the patient for remaining mandibular teeth showing gingival recession. One year follow up examination revealed stable, healthy peri implant soft tissue with osseointegration (Figure 6). The patient was also satisfied with the esthetic and functional outcome.

DISCUSSION

When a tooth is extracted, loss of alveolar bone can be predicted within first six months with 40% of the alveolar height and 60% of the alveolar width loss, which persists at a rate of 0.25% to 0.5% per year.⁵ Traditionally, two to three months period of socket remodeling after tooth extraction and an additional three to six months of load free healing are recommended for osseointegration.⁶ Currently, alternative protocols such as immediate implant placement are considered more reliable treatment options for eliminating the waiting period for socket healing and reduction of bone resorption that normally occurs following the loss of a tooth.¹ In our case, a patient presented with fractured mandibular central incisor which was deemed nonrestorable.

Atraumatic extraction followed by immediate implant placement with bone grafts was chosen as an appropriate treatment option for the management in our case.

The protocol for immediate implants can be described as the procedure in which implant is placed in an extraction socket after tooth removal and socket debridement.² It is most commonly indicated when tooth extraction is done as a result of trauma, endodontic causes, root fracture/resorption/perforation, unfavourable crown to root ratio (not due to periodontal loss) and bony walls of alveolus that are still intact.⁴ Contraindications include presence of active infection, insufficient bone width and height.⁴ In our report, our case was indicated for immediate implants as there was adequate bone height and width without any periapical pathology.

Different category of graft materials have been successfully used as an adjunct with immediate implants which acts as a space maintainer and promote bone formation.¹ In our case, we used synthetic bone graft (Hydroxyapatite and B-Tricalcium phosphate) after implant placement as it maintains osteoconductive property accelerating new bone formation around implants.⁷ This was in consistent with previous report.¹ However, the necessity of bone grafts depends on the thickness of labial plate rather than the size of the gap.⁸ With citation to this, many clinical reports and studies have demonstrated favourable outcomes with immediate implantation without the use of any regenerative materials.⁴ Although a thick labial plate is generally resistant to resorption, which makes grafting unnecessary, bone grafting is frequently used to prevent collapse and minimize resorption of the thin labial plate, regardless of the gap size.¹ Beneficial result was obtained in our case, where we used synthetic bone graft.

Immediate implant placement has considerable advantages over the conventional approach. The multiple advantages include decreased number of surgeries, cost, and healing time.⁹ Additional benefits are maintenance of bone height and preservation of gingival architecture, thus improving implant bone support and aesthetic results.² Patient acceptance of these advantages is good, and psychological stress is avoided by suppressing the need for repeated surgery for implantation. This was indeed perceived by our patient, interpreted in our present case report. However, multiple publications have stated that recession and loss of crestal bone height was appreciated with immediate implantation.¹⁰ Despite considering its disadvantages such as increased risk of poor implant position and implant failure, a high long term (1 to 16 year) survival rate of 96% has been testified for implants immediately placed into extraction sockets.⁹

CONCLUSION

Immediate implant placement with bone graft following atraumatic extraction is a sustainable choice for replenishing the missing teeth. The protocol portrayed in this case report is a technique sensitive procedure requiring multidisciplinary approach. However, careful selection of the case with appropriate treatment plan with an innovative approach is obligatory for long term survival rate.

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