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Implant Placement In Freshly Extracted Socket Using PRF Membrane: A Case Report

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Abstract
Background : *Immediate implant placement in freshly extracted socket gaining popularity because of several advantages. PRF membrane is an autologous fibrin matrix which contain various growth factor which has been used widely for periodontal intrabony pocket, socket preservation .*
Case summary : *The patient was 50 year old female with metal ceramic crown on canine which was mobile. She underwent extraction of canine and immediate implant placement and the gap created between buccal wall of socket and implant was filled with PRF membrane combined with osseous bone graft. Four month postoperatively, the regeneration of bone and soft tissue was visible. Subsequently, the definitive restoration was placed. The patient was satisfied with esthetic outcome.*
Key Word*: PRF, immediate implant placement , autogenous graft*

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I. Introduction

Various protocols for implant placements were defined according to the time (immediate, early and delayed). The conventional protocol suggested a waiting period of 3–6 months for healing after tooth extraction before implant placement. The downsides associated with delayed approach not only the increase in treatment time , but there is the potential of bone and tissue resorption. The placement of dental implant into fresh extraction sockets was introduced in 1970 and is a well established treatment method for replacing missing teeth, allowing immediate restoration of masticatory function, speech and esthetics. Different implant loading protocols have also been evolved. Immediate post extraction implant placement is a well accepted protocol because of shorter total treatment time, maintenance of socket wall, reduced operative time and better actual implant placement.[1,2,3]

In immediate implant placement there is gap present between implant surface and socket wall and there are various materials used to fill this gap for better osseointegration. So to compensate for these problems, guided bone regeneration (GBR) using autografts, allografts, or alloplasts; barrier membranes; or combination therapy has been accomplished, but these materials are either expensive or not so effective[4].

Studies have shown that application of growth factors through platelet rich plasma (PRP), platelet rich fibrin or plasma rich in growth factors in the treatment of intrabony defects. Platelet-rich fibrin (PRF) is a second generation autologous platelet and it is a fibrin mesh consisting of leukocytes and cytokines. It promote healing process, osteoblastic activity, angiogenesis, release growth factors and thereby stimulate defense mechanism. Unlike PRP, PRP prepared without addition of anticoagulant. It provides a rich source of growth factors. This article describes a case in which the fenestration defect around an implant was treated by the application of platelet rich fibrin along with bone graft.[5,6]

II. Case Report

A 50 year old female patient reported to the Department of Prosthodontics Crown and Bridge, St Gregorios Dental college , Chelad, Kothamangalam with a chief complaint of loose cap and pain in the upper front region since one week. Patient wanted to replace the cap with new restoration. On intraoral examination multiple teeth were missing in the mandibular arch and grade II mobile canine was noted and it was tender on percussion (fig 1). Partially edentulous mandibular arch with missing 36,38,44,45,47,48. OPG reveals root canal treated 13,12 and rehabilitated with crown following post and core fabrication, eight unit FDP replacing 21, 23, and 24, three unit FDP replacing 15, and 3 unit FDP replacing 35,34,36.(fig 2).

Figure 1: Preoperative image

Figure 2: Preoperative radiograph

Based on the above findings an atraumatic extraction and immediate implant placement of 13 was planned . The patient was clinically healthy with no history of systemic diseases. Informed consent was taken from the patient.

The surgical Procedure

Briefly after the induction of local anesthesia , atraumatic extraction of 13 was done with periotome (fig 3). Following extraction a thorough curettage of the extraction socket wall was done to eliminate any residual infective tissue that could compromise osseointegration (fig 4) .

Figure 3

Figure 4

Sequential drilling was done with copious saline irrigation to prepare an osteotomy site of desired size. 5 mm diameter and 13 mm length implant was placed in canine region and primary stability of 35 N –cm was ensured (fig 5).

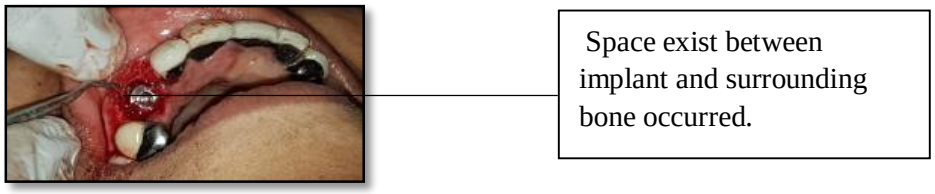

Figure 5

Preparation of platelet rich fibrin

10 milliliters of peripheral venous blood collected into blood collection tube (fig 6). The tube was centrifuged at 10 min at the rate of 30000 revolutions per minute. Centrifugation immediately after collection allows the fibrin clot in the middle of the tube, just between the red corpuscles at the bottom and the acellular platelet poor plasma at the top (fig 7). Using a sterile tweezers and scissors the PRF was easily separated from the red corpuscles and then transferred onto a sterile dapen dish (fig 8) . PRF membrane along with osseous graft was placed in the buccal aspect of the implant to cover the defect and then suturing of the surgical site done (fig 9).

Postoperative instructions given. Antibiotics and analgesics were prescribed and patient recalled after 7 days for suture removal. There was no postoperative complications and healing was satisfactory. Patient was reviewed every two months. Four months following the surgery, the patient was again reviewed, clinically the

width of the ridge showed an increase. Radiographs showed an adequate defect fill.

Figure 6

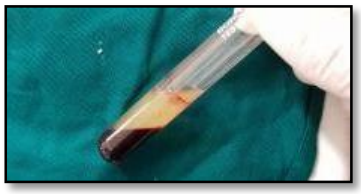

Figure 7

Figure 8

Figure 9: PFR membrane along with osseous graft placed in the buccal aspect

Figure 10 : Provisional restoration

Prosthetic phase : After 4 months , second stage surgery was performed. Abutment placed and after 2 weeks, an implant level open tray impression was made. Porcelain fused to metal crown restoration were placed on 13 after radiographic evaluation and determining their final stability (fig 11).
Postoperative follow up continued clinically and radiographically after 6months of crown placement.

Figure 11: Final prosthesis

III. Discussion

Management of gap between implant and socket wall has become a challenge. In this case PRF membrane was used along with bone grafts which has several advantages, such as promoting wound healing, bone growth, haemostasis, and imparting better handling properties to graft material. PRF as an adjunct to bone graft makes it possible to enhance the graft volume without injuring the maturation quality in new bone. PRF has many advantages over platelet rich plasma (PRP). It eliminates the process of adding anticoagulant as well as the need to neutralize it. The plasma used in this process is the patient's own, reapplication does not present a risk of infections and rejections.[7]

Zaki et al evaluated the effect of combination of platelet rich fibrin and allogeneous bone graft around immediate implant. After placement implants were evaluated clinically and radiographically. There was significant improvement in bone density and reduction in marginal bone loss. Studies showed that PRF is a healing biomaterial for both soft and hard tissue because of the presence of various growth factors.[8]

Kumar N et al conducted a study to evaluate the treatment outcome after impacted third molar surgery with the use of PRF.[9] The application of PRF reduces the severity of immediate postoperative sequelae.Yelamalli and Saikrishnana found better and faster wound healing and bone formation, and stated preparation of PRF is somewhat easier than PRP.

Tatullo et al evaluated the histological and clinical evaluations of 60 patients. The experiment group received only bovine bone graft along with PRF , whereas control group had received only bovine bone . Result had showed that PRF membrane forms new bone, even at 106 days.[10]

Oncu et al in a study reported that the PRF application increased the implant stability during the early healing period and higher ISQ values.[11,12]

The effect of platelet rich fibrin with and without bone ceramic on soft tissue and crestal bone in one stage implant placement in fresh extraction socket have studied by Kishore et al and concluded that the mean crestal bone level increased in PRF with bone ceramic group.[13]

PRF membrane is a good material of choice for filling the bone defect and also the gap that occur between implant and surrounding bone following immediate extraction .PRF membrane can be used in all patients (and even be recommended in patients who use anticoagulant or smokers), they promote the healing of soft tissue.[14]

IV. Conclusion

The use of PRF in daily clinical practice shows promising results. Platelet rich fibrin show high success rate in implant placement in extracted socket sites and provide antiinfective ability. It can be used alone or in combination with other biomaterials. It also facilitates a natural healing and maturation of the periimplant bone and soft tissues around the implant.

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