
Ruchi Sharma1 Tarun Kalra1 Manjit Kumar1 Ajay Bansal1 Ramandeep Singh1

1 Department of Prosthodontics, Bhojia Dental College and Hospital, Baddi, Himachal Pradesh, India

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Address for correspondence Manjit Kumar, MDS, Department of Prosthodontics, Bhojia Dental College and Hospital, Baddi, Himachal Pradesh, 173205, India (e-mail: manjitkiran@yahoo.com).

Abstract

The aim of this article is to present the clinical application of leukocyte-platelet-rich fibrin (L-PRF) at immediately extracted site after the implant placement. A 37-year-old male patient reported to the Department of Prosthodontics, Bhojia Dental college Budh Baddi Dist Solan Himachal Pradesh 173205 with the chief complaint of decayed teeth in the posterior region and wants a fixed prosthesis. On the day of surgery, implants were placed in freshly extracted sockets along with the bone graft and L-PRF membrane. After 6 months of healing period, implant level impressions were made and final porcelain fused to metal crowns were given to the patient.

Keywords
► bone graft
► dental implant
► leukocyte-platelet-rich fibrin

Introduction

In various patients, decayed teeth and roots are present in the oral cavity. In conventional implant treatment these roots and decayed teeth are extracted and extracted socket wound healing takes place for at least 3 to 6 months. However, these patients do not want to wait for a period of 3 to 6 months and want immediate restoration. In these cases, implants are inserted immediately after extraction. This leads to few surgical procedures in the form of raising flaps, and waiting period of treatment is also reduced. Other advantage of this treatment is less physiological bone loss during remodeling phase of extraction sockets.1

The implant treatment guidelines in literature advocated minimum 3-month waiting period after extraction for soft and hard tissue healing followed by an additional loading period for better osseointegration. The prognosis of implant placement immediately after extraction is as good as placing implants into healed sites.2 In most of the clinical situations, dental implant-supported restorations are preferred and most acceptable line of treatment.

In recent era immediate implant placement into a fresh extraction socket is advocated to decrease treatment time, as healing and osseointegration occur side by side.3

For better esthetics and less marginal mucosal recession, some authors advocate minimal flap or no flaps during surgical procedures.

In immediate implant placement for better and fast healing of hard and soft tissues, various growth factors and biomaterials are being used. To avoid intrusion of connective tissue, membranes were used. It is found in literature that leukocyte-platelet-rich fibrin (L-PRF), a second generation of platelet concentrates (PCs), helps in wound healing of both soft and hard tissues.

In immediate implant placement, L-PRF is used at the osteotomy site for better esthetic and function. In platelet-rich fibrin (PRF), tetra molecular structure of an autologous L-PRF matrix acts as binding material that helps in microvascularization and epithelial cell migration. It is present in

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literature that PRF acts as biomaterial for bone and soft tissue regeneration, which may be used along with bone grafts that helps in healing and maturation.

In this case report, clinical efficacy of L-PRF and bone graft in immediate implant placement has been discussed.

Case Report

A 37-year-old male patient reported to the Department of Prosthodontics, with the chief complaint of decayed teeth in the upper right back region. On clinical examination, root stumps were present in regions of 14 and 15 (Fig. 1).

Diagnostic casts were prepared after making impressions with irreversible hydrocolloid (Plasalgin, Septodont, India). Extraoral orthopantomograph and intraoral periapical radiograph with radiovisiography were made to see the condition of roots or any periapical pathology in regions of 14 and 15. A thorough detailed case history was recorded. After due consent of the patient, immediate implant placement after atraumatic extraction was planned. Patient had no relevant past medical history. Before proceeding with the surgery, patient was asked to get all the blood investigations done.

Surgical Procedure

Prophylactic antibiotic in the form of Augmentin, 1 hour prior to the surgery was given to the patient. The patient was prepared for asepsis. Under local anesthesia, 2% lignocaine hydrochloride (Lignocad, Ahmedabad, India), atraumatic extraction of roots in regions of 14 and 15 was done to preserve the buccal bone (Fig. 2). The extraction sites were thoroughly examined, a small buccal bone defect was found, and the root size was measured for tentative implant sizes. Adin titanium implants (Adin, Israel) were inserted with primary stability of 30 Ncm (Fig. 3). PRF membrane and bone graft (Osseo graft Biotech, Chennai, India) were used to preserve the soft tissue contour.

Preparation of PRF Membrane

Overall, 10 mL of venous blood was drawn and immediately put in centrifugal machine (PRFDuo) at 3,000 rpm for 13 minutes. The clot obtained was put on a gauze piece for formation of L-PRF membrane (Fig. 4). Before stabilizing the membrane, bone graft was placed into buccal bone defect and then both the graft and L-PRF membranes were sutured. A postoperative radiograph was made to ensure proper placement of implant.

Postoperative Management

Patient was put on soft diet and 0.12% chlorhexidine gluconate mouth wash twice daily. Systemic antibiotic and analgesic regimen was prescribed. Patient was recalled after 1 week for suture removal.
Final Prosthetic Procedure
The patient was recalled for the definitive prosthesis after healing period of 6 months. Intraoral radiograph was taken, which revealed good osseointegration. Second-stage surgery was performed, cover screws were removed, and gingival formers were placed. Then patient was recalled after 10 days; in-between this period, good gingival collar was formed around the implants. Then impression was made with closed-tray impression copings with Zetaplus (Zhermack, Italy) Putty consistency. Porcelain fused to metal crowns were given to the patient after metal trial (►Fig. 6).

Discussion
Prognosis of immediate implant placement in extracted socket is as high as in healed socket site but carefully selected extraction sockets with minimum bone all around is the important criteria. This technique has advantages of having less surgical procedures, less treatment time, and high esthetic results. Use of bone grafts along with barrier membranes is also important. Patients are psychologically very satisfied with this technique. This is highly important in patients having public appearance, with psychological

Table 1 Protocols for implant placement in extraction sockets and their advantages and disadvantages

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<th>Classification</th>
<th>Definition</th>
<th>Advantages</th>
<th>Disadvantages</th>
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| Type 1        | Implant is placed immediately following tooth extraction and as part of the same surgical procedure | • Reduced number of surgical procedures  
• Reduced overall treatment time  
• Optimal availability of existing bone | • Site morphology may complicate optimal placement and anchorage  
• Thin tissue biotype may compromise optimal outcome  
• Potential lack of keratinized mucosa for flap adaptation  
• Adjunctive surgical procedures may be required  
• Procedure is technique-sensitive |
| Type 2        | Complete soft tissue coverage of the socket (typically 4–8 wk)            | • Increased soft tissue area and volume facilitates soft tissue flap management  
Resolution of local pathology can be assessed | • Site morphology may complicate optimal placement and anchorage  
• Treatment time is increased  
• Socket walls exhibit varying amounts of resorption  
• Adjunctive surgical procedures may be required  
• Procedure is technique-sensitive |
| Type 3        | Substantial clinical and/or radiographic bone fill of the socket (typically 12–16 wk) | • Substantial bone fill of the socket facilitates implant placement  
• Mature soft tissues facilitate flap management | • Treatment time is increased  
• Adjunctive surgical procedures may be required  
• Socket walls exhibit varying amounts of resorption |
| Type 4        | Healed site (typically more than 16 wk)                                   | • Clinically healed ridge  
• Mature soft tissues facilitate flap management | • Treatment time is increased  
• Adjunctive surgical procedures may be required  
• Large variations are present in available bone volume |
trauma of missing teeth and the anxiety of a surgical procedure. In few months of treatment without additional surgical procedures, better functional and esthetic outcome can be achieved for long-term prognosis. The time of implant insertion has been classified by various authors in the literature but clinical practice of the same is lacking in this field.

The L-PRF is a bioactive material, classified as a second generation of PCs that appeared to improve and simplify the use of these preparations. After the centrifugation, three layers are formed: red blood cells at the base, the L-PRF clot in the middle, and platelet-poor plasma at the top. The L-PRF clot can be used as a membrane if it is compressed or it can be used directly as a clot or mixed with bone material. The L-PRF is characterized as an optimized blood clot. L-PRF contains almost all the platelets (± 95% of initial blood) and more than 50% of the leukocytes of the withdrawn blood. In that way, L-PRF has a strong fibrin structure with a specific three-dimensional distribution of platelet aggregates and leukocytes making it denser than other fibrin-rich materials and influencing its biologic kinetics. This biomaterial has a high resistance, flexibility, and elasticity, and it is safe, given its capacity to seal biological tissues.

Conclusion

In the present case report, implants were successfully placed in immediate extraction site with the help of bone graft and L-PRF membrane. The use of PRF membrane and other substitutes can help in better esthetics and better healing. Clinically and radiographically, bone structure and soft tissue condition were satisfactory after 6 months.

Conflicts of Interest

None.

References