Treatment of Oral Mucosal Lesions by Scalpel Excision and Platelet-Rich Fibrin Membrane Grafting: A Review of 26 Sites

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Purpose: One of the preferred treatment options for oral mucosal lesions (eg, leukoplakia and lichen planus) is excision, with or without the use of a coverage agent. Platelet-rich fibrin (PRF) membranes are popular fibrin scaffolds with entrapped platelets that release various growth factors and cytokines to support and enhance wound healing. The aim of the present report was to describe the technique, postoperative wound care, and clinical results of PRF membrane grafting after excision of superficial potentially malignant oral lesions.

Materials and Methods: Autologous PRF membrane was fabricated and grafted over 26 wounds created by excision of small, superficial, potentially malignant lesions of oral mucosa (or fiberotomy in cases of oral submucous fibrosis) and assessed clinically at 7, 15, 30, and 60 days.

Results: Healing was satisfactory in all cases, with minimal and manageable complication at 1 site.

Conclusion: The results of the present study suggest that PRF membrane is a successful coverage agent that aids in the healing of superficial oral mucosal wounds. Additional comparative studies are required to establish its efficacy compared with that of other agents.

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The common potentially malignant oral mucosal lesions mainly include leukoplakia, erythroplakia, lichen planus, and oral submucous fibrosis (OSMF).[1] The management of oral lesions in these disorders can be medical or surgical.[2] Most of the patients with symptomatic lesions or failed medical therapy will opt for surgical management, which includes localized excision of the lesion and fiberotomy in cases of OSMF, with or without graft placement.[2-4] Platelet-rich fibrin (PRF) is a second-generation platelet concentrate, developed in 2001 by Choukroun et al,[5] now defined as "an immune and platelet concentrate collected on a single fibrin membrane containing all the constituents of a blood sample favorable to healing and immunity."

This new biomaterial is simply centrifuged blood without any additives,[6] constituting a fibrin matrix polymerized in a tetramolecular structure, with incorporation of platelets, leukocytes, cytokines, and circulating stem cells.[5,7] Clinical studies have revealed that this biomaterial promotes wound healing, wound sealing, and hemostasis.[8] PRF has certain clear advantages over other platelet concentrates, including simple, quick, single-staged fabrication, cost-effectiveness, and no addition of bovine thrombin or anticoagulants, reducing the risk of antigenicity.[6,8-10] It is also shown that conversion of fibrinogen to fibrin in PRF is slow, with physiologically available thrombin of blood, creating a fibrin network similar

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to a natural one, leading to more efficient cell migration and proliferation.[8,11]

This autologous membrane has been well used as a surface-covering agent in various regeneration procedures and chronic, nonhealing, hard and soft tissue wounds all over the body, such as in esthetic plastic surgery (PRF clots with fat in facial lipostructure),[12] ear, nose, throat surgery (PRF membranes for tympanic perforation repairs),[13] regenerative medicine (PRF membranes in the healing of dermal wounds),[14,15] and various other fields.[13] Recently, its use has been tried in intraoral bony defects, such as extraction sockets,[16] nonhealing wounds created by bisphosphonate-related osteonecrosis of the jaw,[17] cystic cavities, preprosthetic surgery with bone grafts, peri-implant defects, and coverage of gingival recession.[18-20] It was hence proposed that grafting of autologous PRF membrane after excision of superficial, nondysplastic, potentially malignant, oral lesions could help in wound coverage and might have a positive effect on wound healing and epithelialization. The objectives were to evaluate operability (ease of use) of this bioscaffold intraorally at sites such as the buccal, labial, lingual, and palatal mucosa; to clinically assess the wound coverage and healing after PRF membrane placement; and to evaluate its safety and adverse effects, if any.

Materials and Methods

The present prospective, interventional, uncontrolled study consisted of 20 patients with biopsy-proven potentially malignant lesions of oral mucosa that were superficial (involving only the mucosal and submucosal depths) and nondysplastic in nature. These included oral leukoplakia, lichen planus, and mild, localized, and OSMF at single or multiple sites of the oral mucosa. Of the 20 patients, 4 were excluded, leaving 16 patients and 26 sites for the final evaluation. The inclusion criteria were patient age older than 20 years, the presence of superficial oral mucosal lesions 3 cm in maximum dimension, hemoglobin level greater than 9 g/dL, and platelet count greater than 100×10^9/L. The excluded patients were those with conditions causing hemodynamic changes in the body, uncontrolled systemic diseases, ongoing chemotherapy or radiotherapy, current tobacco use (within <6 months of quitting), long-term antibiotic use, steroid use, antiplatelet drug use, active systemic infection (clinical, laboratory, and/or culture evidence), and women who were pregnant, lactating, or taking oral contraceptives. The procedure was explained to the patients, and all patients provided written informed consent. The institutional ethical board approved the study. All the guidelines from the Declaration of Helsinki were followed.

Oral prophylaxis was performed preoperatively in all patients requiring the same. For surgery, the sites were anesthetized by local infiltration using 2% lignocaine with adrenaline (1:80,000). Scalpel excision of the lesions was performed, creating a partial thickness wound (defined by excision up to the submucosal depths only and not involving the underlying muscle). The protocol for fabrication of the PRF clot and membrane was as follows. The required quantity of blood was drawn from the patient's peripheral vein; 10 mL of blood was transferred into each sterile glass tube (without anticoagulants) and immediately centrifuged at 3,000 rpm for 10 minutes in a laboratory centrifuge machine (REMI-R-8C; Remi Laboratory Instruments, Mumbai, India). A 3-layered structure was obtained, either immediately or after thawing the fluid for a few minutes after centrifugation. A structured PRF clot was formed in the middle of the tube, below which were the red blood cells, with the topmost layer, a thin layer of supernatant plasma (platelet-poor plasma [PPP]). The PRF clot was drawn with the help of a tweezers and pressed between 2 moist gauze-covered glass slabs of standard size for 30 seconds to obtain a membrane of adequate thickness and quality. Next, 10 mL of blood in a standard glass tube resulted in a PRF clot that could be pressed into a membrane of about 3 × 1 cm (Fig 1). Until use, the membranes were kept covered in the wet gauze and humidified routinely with the supernatant plasma (PPP) that had remained in the glass tube and saline. They were positioned over the wound and sutured with resorbable sutures (3-0 Vicryl). In the case of larger mucosal defects, multiple membranes were placed over the wound and sutured to the margins of the wound and to each other (Figs 2 to 4). Hemostasis was readily achieved in all cases during and after grafting. Paraffin gauze was placed over the graft, and a pressure dressing with a moist gauze roll was applied for 24 hours. In cases of OSMF, all third molars were extracted before surgery, fiberotomy was performed, and a Fergusson mouth gag was applied to increase the intraoperative maximum mouth opening (MMO) as much as possible. Neither patient with OSMF had given consent for coronoidotomy or coronoidectomy to further improve their intraoperative MMO. Hence, no additional procedure was performed beyond fiberotomy and PRF membrane grafting. All patients received broad-spectrum antibiotics and analgesics for 5 to 7 days (oral amoxicillin 500 mg every 8 hours, oral ibuprofen 400 mg every 8 to 12 hours, if needed) and were instructed to consume a liquid or semisolid diet (food items that could be swallowed directly) for 1 week after surgery. Oral metronidazole (400 mg every 8 hours) was added to the antibiotic regimen in the case of sloughing (1 patient). After 24 hours of