



Applications of Platelet Rich Fibrin in Oral and Maxillofacial Surgery

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Surgical Note

Platelet-Rich Fibrin (PRF) is an autologous biological product prepared quickly by taking blood samples into a sterile tube without an anticoagulant, and it does not induce any immunological reaction. It was first developed by Choukroun, as it is a second-generation platelet concentrate [1]. The PRF clot forms a strong natural polymerized fibrin matrix in a molecular structure that contains concentrations of almost all the platelets, growth factors, circulating stem cells, and leukocytes [2].

PRF consists of an intricate collection of cytokines, chemokines, structural glycoproteins entangled inside a gradually polymerized fibrin network, and growth factors such as Platelet-Derived Growth Factor (PDGF) is the first growth factor released in a wound healing mechanism, which stimulates revascularization and collagen synthesis, Vascular Endothelial Growth Factor (VEGF) mainly affects growing of new born vessels and specific mitogen of endothelial cell, Transforming Growth Factor β -1 (TGF- β 1) stimulates collagen deposition, Bone Morphogenetic Protein-1 (BMP-1) is responsible for bone formation, fibroblast growth factor, and several other angiogenic factors that stimulate the growth of the cells, and promoting the wound healing [3,4].

It has been reported that PRF stimulates the proliferation of osteoblasts, gingival fibroblasts, and periodontal ligament cells. These cell types are beneficial for tissue regeneration and bone healing acceleration [3,5]. Also, PRF increases vascularization, suppresses inflammation and infection, reduces bleeding at the operating site by promoting vascular hemostasis, stimulates the recovery of soft tissues, and reduces the local pain [6].

Therefore, the clinical application of PRF in the oral and maxillofacial regions has been extended widely. It is an effective method for sinus perforation, sinus lift grafting, ridge augmentation, periodontal regeneration surgery, and socket preservation [7,8]. Additionally, PRF is used in drug related osteonecrosis of the jaws, cosmetic dermatology, the treatment of lichen planus,

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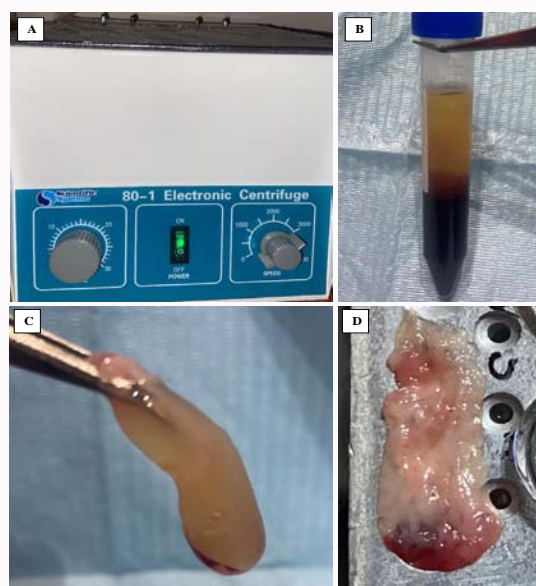


Figure 1: The pictures show the stages for the preparation of the PRF membrane: (A) Centrifuge device. (B) Production of a PRF clot in a blood collection tube after centrifugation: PRF in the middle of the tube, RBCs collected at the base, and acellular plasma in the top layer. (C) The PRF clot. (D) The PRF membrane.

and otolaryngology, such as using the PRF membrane to cover the turbinectomy site to improve nasal mucosal healing, decrease nasal crusting, and maintain its normal physiological lining [9-11].

Protocol of PRF membrane preparation

– PRF membrane was prepared according to the Choukroun protocol:

– 10 ml of autologous venous blood was collected in sterile tubes without the addition of any anticoagulant. The tubes were inserted immediately into a centrifuge device for 10 min at 3,000 revolutions per minute (rpm).

– The blood sample was separated into three layers at the end of the centrifugation process: The upper straw-colored acellular plasma layer; the middle layer included fibrin clot in which platelets were trapped in the fibrin meshes; and the red lower layer included Red Blood Cells (RBCs).

– The lower attached RBCS was separated and discarded by using surgical scissors. The middle fraction containing the fibrin clot was collected and packed in a special A-PRF box to form the PRF membrane [12,13] (Figure 1).

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