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CORRESPONDENCE

Clinical application of platelet-rich fibrin as the sole grafting material in maxillary sinus augmentation



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Platelet-rich fibrin (PRF) was first described by Choukroun et al¹ in 2001. PRF is derived from an autogenous preparation of concentrated platelets without any manipulation. PRF is a consistent fibrin biomaterial enriched with platelets and growth factors, after starting from an anticoagulant-free blood harvest. Recently, PRF has been used as an autologous grafting material because of its ability to accelerate physiologic wound healing and new bone formation. The present study reports a patient who received maxillary sinus floor augmentation with simultaneous implant placement using PRF as the sole grafting material with radiologic and histologic analyses.

A 59-year-old man suffered from atrophy of maxillary posterior edentulous areas that required a sinus lift before implantation. Preoperative panoramic radiograph exhibited bilateral maxillary bone atrophy with a residual crest height of <5 mm (Fig. 1A). PRF clots and membranes were prepared as described previously.¹ During surgery, 72 mL whole blood was drawn into eight glass-coated plastic tubes without anticoagulant and was immediately centrifuged at 3000 rpm for 12 minutes (Process, Nice, France). Sinus augmentation followed the lateral wall protocol with local

anesthesia. In brief, after a buccal mucoperiosteal flap was raised, an osteotomy was prepared in the lateral wall of the sinus (Fig. 1B). After the Schneiderian membrane was carefully elevated, PRF as grafting material was packed into the space between the sinus floor and the Schneiderian membrane. Finally, the PRF membrane was covered on the access window before flap closure. Dental implants (Intra-Lock, Boca Raton, FL, USA) were placed 6 months after sinus augmentation (Fig. 1C). Healing processes under regular clinical examination during the first 6 months were uneventful. Six months after sinus-lift surgery, panoramic radiograph demonstrated that sinus cavity around the implants was filled with a dense bone-like tissue (Fig. 1D). Bone biopsies were harvested during the uncovering and placement of healing screws. The histological examination revealed new bone formation and fibrovascular stromal tissue (Fig. 1E). There was no evidence of any inflammatory infiltrate. Fibrous tissues and blood vessels were also found in the trephined core. Osteocytes were found to be regularly dispersed in the newly formed bone tissue. Osteoblasts were evident on the bone surface (Fig. 1F).

Clinical applications of PRF have already been described in socket preservation,² periodontal regeneration surgery,³ and radicular cyst enucleation.⁴ Our previous study reported that PRF can stimulate cell proliferation of osteoblasts and may be beneficial for new bone formation.⁵ Sinus augmentation with simultaneous implant placement without bone graft material is a highly debated technique. In this technique, implants are used as tent pegs to define the required bone volume from the blood clot. The use of

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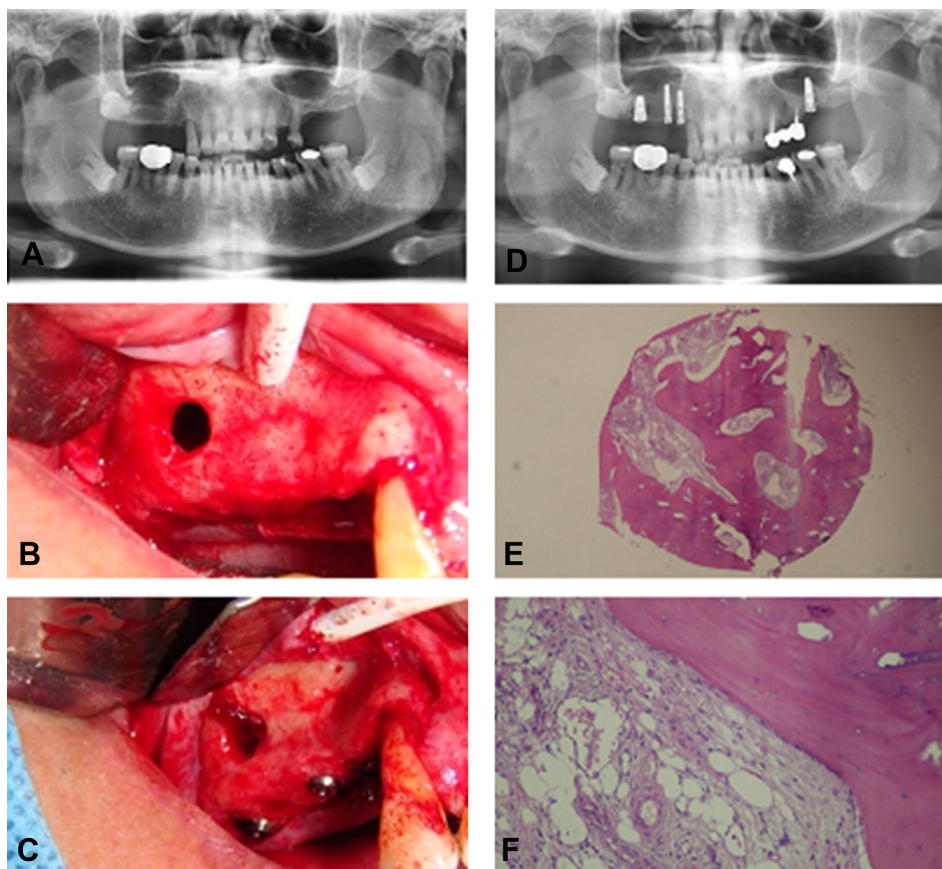


Figure 1 (A) Initial panoramic radiograph exhibited bilateral maxillary bone atrophy with a residual crest height of <math><5\text{ mm}</math>. (B) Clinical photograph for right lateral wall osteotomy. (C) Platelet-rich fibrin application with simultaneous implant placement. (D) Postoperative panoramic radiograph revealed dense bone-like tissues around the implants after 6 months. (E) Newly formed bone and fibrovascular stromal tissue were shown in the trephined core (hematoxylin and eosin staining, original magnification $\times 20$). (F) Osteocytes, osteoblasts, fibrous tissues, and blood vessels were evidenced (hematoxylin and eosin staining, original magnification $\times 100$).

PRF may improve this technique. From radiologic and histologic results at 6 months after surgery, the use of PRF as sole filling material applied in simultaneous sinus lift and implantation demonstrated a new bone formation in the augmented areas. PRF seems an adequate adjuvant to secure this technique for new bone regeneration.

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