

# Platelet Rich Plasma - A Novel Aid in Periodontal Plastic Surgery

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## Abstract

The main goal of periodontal therapy is the regeneration of tooth-supporting structures affected by periodontitis. A recent innovation in dentistry is the preparation and use of platelet-rich plasma (PRP), a component of blood in which the platelets are concentrated in a limited volume of plasma. PRP has been used in adjunction with various periodontal surgical procedures and has shown to have challenging results. We present here a case report of a 24 year old male patient who reported with a chief complaint of exposed tooth surface. The condition was treated by using a subepithelial connective tissue graft along with the use of platelet rich plasma. Complete root coverage was obtained after a period of 3 months without any post-operative complications and a good color match was obtained.

## Key Words

Regeneration; PRP; periodontal surgeries

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## INTRODUCTION

Periodontal plastic surgery procedures have evolved into routine treatment modalities. Esthetic concern, root hypersensitivity, prevention or management of root caries and cervical abrasion, enhancement of restorative outcomes, and facilitation of plaque control efforts are few of the main indications for root coverage procedures. The goal of periodontal therapy is to protect and maintain the patients natural dentition over his or her lifetime for optimal comfort, function and esthetic appearance.<sup>[1,2]</sup> Various different techniques that have been used are the: Free autogenous grafts and pedicle grafts including rotational flaps, advanced flaps, and semilunar flaps have been advocated. Combination grafts with either autogenous grafts or allograft and with GTR membranes have also been used.<sup>[3]</sup> The advances in root coverage include the use of various adjunctive agents such as acellular dermal matrix graft,<sup>[4]</sup> enamel matrix derivative,<sup>[5]</sup> recombinant human growth factor and platelet rich plasma (PRP). PRP derived from concentrated platelets a mediator, which has many growth factors. These growth factors play a role in all stages of cell cycles and stimulate chemotaxis and production of

extracellular matrix proteins.<sup>[6]</sup> Administration of these growth factors have been combined with tissue regeneration techniques in repair of intrabony defects,<sup>[7]</sup> furcation<sup>[8]</sup> and sinus augmentation.<sup>[9]</sup> All these procedures have demonstrated new bone formation and bone healing. Platelet-rich plasma (PRP) contains growth factors that may enhance early healing, especially mitogenesis and angiogenesis. Improved early healing has the potential to improve the clinical outcome of a procedure by promoting more rapid soft tissue attachment to the tooth. Previous studies that have used PRP with root-coverage procedures, including a subepithelial connective tissue or a free gingival graft, showed only a minimal effect on the clinical outcome.<sup>[8-10]</sup> In the case described in this article, platelet rich plasma (PRP) was combined with a Subepithelial connective tissue graft.

## CASE REPORT

A male patient reported to us with a chief complaint of exposure of the tooth surface in the lower front teeth region (31, 41, 42, 43). On examination, Miller Class I Gingival recession in relation to 31, 41, 42, 43 (shallow wide) was observed with inadequate width of keratinized gingiva. Baseline



Fig. 1: Pre-Operative View



Fig. 2: Armamentarium Used



Fig. 3: Preparation of Recipient Site



Fig. 4: Reflection of Partial Thickness Flap



Fig. 5: Procurement of Graft From Donor Site



Fig. 6: Application of PRP



Fig. 7: Stabilization of Graft

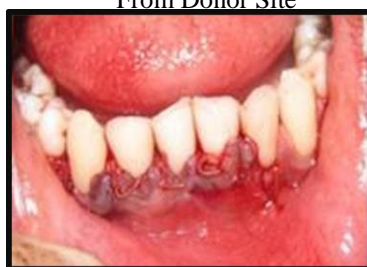


Fig. 8: Complete Coverage of the Graft



Fig. 9: 6 Months Post-Operative View

width was approximately 2-3mm and the recession depth was about 2-3mm. A thorough scaling and root planing was carried out and the patient was recalled for further evaluation. On the subsequent visit a sub-epithelial connective tissue graft procedure along with the use of PRP was planned to obtain the optimal root coverage in the affected area.

#### PREPARATION OF PRP

One hour before the surgery, 10 ml of blood was drawn from the antecubital vein into the vacutainers containing 3.2% anticoagulant sodium citrate. To separate and concentrate platelets, two separate centrifugations were done. In the first, the blood was centrifuged at 2000 rpm for 2 min which separated the red blood cells from the rest of the whole blood (white blood cells, Platelets and Plasma) with a thin white line in between (called as buffy coat), which has maximum concentration of platelets. The plasma and the buffy coat were pipetted out in a separate test tube and centrifuged at 4000 rpm for 8 min. The second spin resulted in two separate fragments. The bottom layer was the

PRP which was overlaid by supernatant fluid platelet poor plasma (PPP). PPP is pipetted out in a separate test tube. The PRP is then used for the procedure. PRP was obtained by the modified method of Curasan.

#### SURGICAL PROCEDURE

The recipient site was prepared and a partial thickness flap was elevated. The donor site was selected and prepared. A sub-epithelial connective tissue graft was obtained from the palatal surface of 23, 24, 25 region. The recipient site was covered with PRP membrane along with the sub-epithelial connective tissue graft. The donor as well as the recipient site was covered with periodontal pack and the patient was advised to follow the post-operative instructions. Wound healing was uneventful both at the recipient and donor site without any post-operative complications. Complete root coverage was obtained after a period of 6 months.

#### DISCUSSION

The goal of periodontal therapy is to protect and maintain the patients natural dentition over his or her lifetime for optimal comfort, function and

esthetic appearance. Along with root coverage it is necessary to achieve an increased zone of keratinized gingival also. PRP is rich in growth factors and helps in soft-tissue healing, initial clot stabilization and revascularization of the flaps and grafts in root coverage procedures.<sup>[8]</sup> PRP acts as a scaffold when used along with bone graft. The placement of PRP on a recession defect is difficult so it is usually used in adjunction with carrier such as collagen sponge or other graft materials.<sup>[9]</sup> In the present study, PRP was used along with a sub-epithelial connective tissue graft. During one week post-operative examination, the gingival appearance was evaluated and it was nearly normal in appearance ranging between no gingival erythema or edema to a slight erythema and edema. This shows an accelerated soft-tissue healing. The presence of growth factors in PRP such as platelet derived growth factor (PDGF), transforming growth factor  $\beta$  (TGF- $\beta$ ) and vascular endothelial growth factor (VEGF) enhance soft-tissue healing by hastening the angiogenesis and matrix biosynthesis during early wound healing.<sup>[10]</sup> In the present case a successful outcome was obtained by using PRP along with sub epithelial connective tissue graft for root coverage procedure with no significant post-operative complications.

### CONCLUSION

PRP is a new application of tissue engineering. Although the growth factors and the mechanisms involved are still poorly understood, the ease of applying PRP in the dental clinic and its beneficial outcomes, including reduction of bleeding and rapid healing, holds promise for further procedures. PRP may become a routine treatment modality for periodontal regeneration in future because of its added advantages.

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