

## Case Report

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# Utilizing Autologous Platelet-Rich Plasma (APRP) as a Supplemental Treatment in Plastic Surgery

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## Abstract

To explore the utilization of Autologous Platelet Rich Plasma (APRP) as a complementary treatment for diverse conditions in plastic surgery. APRP can be used as an adjunct treatment to enhance outcomes in different plastic surgery cases. Given its abundance in diverse growth factors, APRP holds promise as a supplemental therapy to improve outcomes across various plastic surgery procedures.

**Keywords:** autologous platelet rich plasma; aprp; wound healing

## Introduction

Wound healing is a complex and coordinated process comprising multiple overlapping stages. Optimal healing necessitates the presence of various growth factors, among which platelets play a crucial role. Extensive research has established the significance of platelets in promoting wound healing by releasing essential growth factors. Additionally, platelets facilitate the secretion of bioactive proteins that attract key cells such as macrophages, mesenchymal stem cells, and osteoblasts, thereby aiding in the removal of necrotic tissue and promoting tissue regeneration and healing. Autologous Platelet Rich Plasma (APRP) has emerged as a valuable tool in expediting wound healing. Platelet-Rich Plasma (PRP) is characterized by its elevated platelet concentration and contains a rich assortment of clotting and growth factors. APRP boasts significantly higher levels of platelet-derived growth factor (PGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), and fibroblast growth factor (FGF) compared to normal plasma. This heightened concentration of growth factors in APRP enhances tissue regeneration and healing processes. Given its remarkable properties in tissue repair and regeneration, APRP is increasingly recognized as an adjunct therapy for various conditions in plastic surgery. This discussion underscores the significance of APRP as a supplemental treatment modality in plastic surgery.

## Materials and Methods

This study was conducted in the department of Plastic Surgery, JIPMER, Pondicherry, India. APRP has been tried as an adjuvant therapy for wound healing for a patient with electrical burns over the scalp. Patient's demographic profile was recorded in the study proforma. APRP was prepared using standard and validated technique described by Li, Weivei et al. After taking informed consent 45 ml of whole blood was taken from peripheral vein with sterile precautions and 0.5 ml of 3.2% Sodium Citrate was added to make it 5 ml (blood:anticoagulant 9:1). The centrifugation tube was placed in centrifugation apparatus. The solution was centrifuged at 3000 rpm for 10 minutes. Three portions were seen after first centrifugation. Upper portion containing plasma and platelets, middle portion containing White blood cells (WBCs) with platelets (Buffy coat) and lower portion containing red blood cells (RBCs). Middle and lower portions are discarded. Upper portion was transferred taken in a new tube for recentrifugation at 4000 rpm for 10 minutes. Following which two portions were seen. Upper 2/3rd portion containing platelet poor plasma and the lower 1/3rd portion containing platelet rich plasma (erythrocyte with platelet clumps). Lower 1/3rd portion was used for APRP therapy. In this patient, subcutaneous injection of APRP was given around the wound margin circumferentially using 23G needle.

## Results

Wound healing was found to be hastened by application of APRP, proving the efficacy of using APRP in treatment for wound healing.

## Discussion

Wound healing is a complex series of overlapping events that includes three phases- Phase of Inflammation, phase of proliferation, and phase of remodeling. Platelets play an important role and it is crucial for wound healing, especially in the initial phases. Among other factors, platelets are an important factor in mediating wound healing and their deficiency may cause impaired wound healing. Optimum wound healing cannot be achieved in the absence of growth factors. The concentration of these proteins decreases after 3-5 days. Construction of new connective tissue, hemostasis, and revascularization is done by Platelets, Platelet Rich Plasma (PRP) is defined as a portion of the plasma fraction of autologous blood having a platelet concentration. PRP functions as a tissue sealant and drug delivery system, platelet helps in wound repair by releasing locally acting growth factors via a-granules degranulation. Being an Autologous component PRP is safe as it is free of antigenic components. It is easy to prepare, less time taking and cost effective. We prepared APRP in our department for various kinds of wounds reconstructive procedures. Depending on the nature of wound and its response APRP was repeated weekly. We used this modality in almost all kinds of wounds and procedures, ranging from chronic wounds to Microvascular flaps and cosmetic surgery. We found this modality as an effective technique for enhancing wound healing and improving outcomes in various. fields of surgeries in plastic surgery. A prospective, controlled, large sample size study with statistical analysis is needed for further evaluation.

## Conclusion

APRP proves beneficial in promoting wound healing across a spectrum of cases, regardless of whether they are acute or chronic and irrespective of their underlying causes. Its utility extends to burn injuries as well as within the realm of cosmetic surgery. Our case report findings affirm that APRP contributes to enhanced wound healing across diverse wound types.

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