Platelet-Rich Plasma (PRP) for Hair

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ABSTRACT
Platelet Rich Plasma (PRP) for baldness is appropriate for male pattern hairlessness, diminishing hair and female baldness. It can be utilized to thicken existing hair and empower the development of new hair. Diminishing or baldness on the scalp can be dealt with by Platelet Rich Plasma which fortifies dormant hair follicles, urging them to begin developing once more. Blood is taken from the patient in the very same way that it would be taken in a standard blood test. This blood is then spun in a centrifuge which isolates out the cells, serum and platelets. These platelets (containing the natural growth factors like Platelet-Derived Growth Factor (PDGF), Fibroblast Growth Factor (FGF) that stimulate dormant cells to advance collagen and tissue development) are then drawn into a syringe and infused into zones of the scalp. You ought to begin to see and feel a change to the treated scalp inside three months of the treatment and you will likewise see a decrease in the measure of hair being shed. And within six months the hair will begin to look and feel thicker. PRP is not a perpetual cure for baldness and won't keep new bald areas from forming. It ought to thicken the hair in the scalp range that has been dealt with and lessen the amount of hair that is shed.

Keywords: Platelet Rich Plasma (PRP), baldness, Platelet Derived Growth Factor, Fibroblast Growth Factor (FGF)

INTRODUCTION
Platelet-rich plasma (PRP) means "abundant platelets that are concentrated into a small volume of plasma" [1]. The pivotal discovery of platelet-derived growth factor (PDGF) in promoting wound healing, angiogenesis and tissue remodelling threw light on this novel autologous therapeutic modality. The documented success of PRP in dentistry and surgery [1] has fuelled research on its role in other specialities like dermatology and aesthetics. [2] It has been revealed that PDGF signals in cell interactions are required for hair canal formation and growth of dermal mesenchyme, thereby opening newer perspectives for PRP in hair restoration. [3]

LITERATURE REVIEW
In the last few years, a lot has been written about platelet-rich plasma (PRP) and its potential validity in the treatment of hair loss.
But, there are still lingering questions about it, such as:
- What exactly is platelet-rich plasma for hair?
- How does it work on the hair?
- What is the procedure?
- Are all PRPs the same?
- Is PRP treatment a boon or a bane?
Platelet-rich Plasma (PRP) Treatment

Blood is mainly a liquid (called plasma). It also contains small solid components (red cells, white cells, and platelets.) The platelets are best known for their importance in clotting blood.\(^\text{(4)}\) However, platelets also contain hundreds of proteins called growth factors which are very important in the treatment of hair loss as they stimulate natural hair growth.

PRP is plasma with many more platelets than what is typically found in blood. The concentration of platelets — and, thereby, the concentration of growth factors — can be 5 to 10 times greater (or richer) than usual.\(^\text{(5)}\)

To develop a PRP preparation, blood must first be drawn from a patient. The platelets are separated from other blood cells and their concentration is increased during a process called centrifugation.\(^\text{(4)}\) Then the increased concentration of platelets is injected into the scalp.

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Platelet-rich Plasma (PRP) for the Hair

Although it is not exactly clear how PRP works but the increased concentration of growth factors in PRP can potentially stimulate natural hair growth.

With a thin needle, your own Platelet-Rich Plasma (PRP) is injected into the scalp. Then the growth factors in your blood cells do their job and hair growth is naturally stimulated.\(^\text{(7)}\)
PRP Hair Restoration is suitable for both men and women. It is a state of the art, non surgical, totally natural, alternative medical procedure used for the treatment of hair loss or hair thinning. It is an injectable treatment which uses the patient’s own blood. [9]

**The Procedure**

1. A small amount of blood (less than 50 ml) is obtained from the patient.
2. Platelet-Rich Plasma is isolated following the centrifugation of blood.
3. PRP is activated with DNA activators (thrombin) and enriched with calcium ions (e.g. calcium chloride).
4. Activated PRP is injected into the area which is suffering from hair loss in order to stimulate hair growth.

![Figure 3: Step-wise procedure of PRP Treatment](image)

PRP process can be used as a respective solo treatment for maintenance and preservation of existing hairs, or it can also be coupled with any of the procedures for hair restoration, allowing partially transected follicles (cells) to prosper.

Ultimately, the process not only helps hair to regenerate, but the dermis and epidermis area of the donor heal faster. [11]

**Are all PRPs the same?**

The answer is NO; all PRPs are not the same. It is based on the classification of the platelet concentrates. The development of a wide range of preparation protocols, devices and centrifuges for varying indications have led to a number of different platelet concentrates, unfortunately all under the same name as PRP. Platelet concentrates are classified into four categories depending upon their leucocyte and fibrin content as follows. [12]

P-PRP (Pure platelet-rich plasma)

The P-PRP concentrate consists of an undetermined fraction of buffy coat, containing a large number of platelets, but most leucocytes are not collected. After the first slow spin centrifugation, only the superficial buffy coat layer is pipetted out and prepared for next centrifugation.
L-PRP (Leucocyte- and platelet-rich plasma)
L-PRP consists of most of the platelets, along with leucocytes and some residual RBCs, suspended in fibrin-rich plasma. It differs from P-PRP only on the means of buffy coat layer collection in which PPP along with the entire buffy coat layer and superficial 1-2 mm layer of RBCs are pipetted out. These protocols employ gelifying agents or a separator gel within the centrifugation kit to enhance the complete collection of the buffy coat layer. Automated systems for L-PRP are PCCS and SmartPReP.

Figure 4: P-PRP and L-PRP [12]

P-PRF (Pure platelet-rich fibrin)
The term PRF is used synonymously with platelet-rich fibrin matrix (PRFM). When P-PRP is mixed with activator and allowed to incubate for some time, a stable PRFM clot can be collected which has useful applications as described below. Very low amounts of leucocytes are collected owing to a specific separator gel used in the device.

L-PRF (Leukocyte- and platelet-rich fibrin)
Here, blood is collected without any anticoagulant and immediately centrifuged. A natural coagulation process then occurs and three layers are formed: the RBC base layer, acellular plasma top layer and L-PRF clot in the middle, which harvests platelet and leucocyte growth factors into the fibrin matrix. There is no biochemical modification of the blood, i.e. no anticoagulants, thrombin or CaCl₂ are required. When pressed between two gauzes, the PRF clot becomes a strong membrane which also has potential applications.

Figure 5: Platelet-Rich Fibrin clot [13]
Concentration of PRP
The mean blood platelet level is 200,000 ± 75,000/μL. Although the PRP platelet count has not been optimized, a platelet concentration of more than 1 million/μL (approximately four to seven times the mean levels) is generally regarded as the therapeutically effective concentration of PRP. Further, a bell-shaped response curve indicating a dose dependant nature has been associated with PRP. It has been demonstrated that lower or higher concentrations than 1.5 million platelets/μL, seemed to inhibit the angiogenic potential in human endothelial cells. In vitro studies on dermal papilla cells have also supported PRP at concentrations of five to ten times the mean levels. All the FDA-cleared PRP separator devices have been shown to achieve this therapeutic concentration of PRP.

CONCLUSION

PRP - A boon or a bane
PRP is a boon because:
- slowing the rate of hair loss
- re-growing thinning hair to be thicker and fuller (Figure 6)
- boosting the health and condition of the scalp
- stimulating collagen levels
- preparing the scalp for hair transplantation & post hair transplantation

PRP can also assist in the treatment of skin and scalp conditions such as:
- dry, itchy and inflamed scalp
- genetic hair loss
- alopecia areata
- telogen effluvium (commonly caused by stress)
References

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