

# Assessment of Efficacy and Safety Profile of Platelet Rich Plasma (PRP) Therapy with Derma Roller in the Treatment of Female Pattern Hair Loss

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**Abstract:** Background: PRP, known as “Growth Factor Cocktail” is Plasma rich in Growth factors. It is an autologous platelet gel having a large concentration of platelets suspended in a small volume of plasma (1 lakh/ $\mu$ L) above the baseline. This unique power-packed composition of Growth factors contained within alpha granules of platelets act on stem cells in the bulge area of hair follicles to stimulate development of new follicles along with neovascularization. Materials and Methods: After routine investigations and informed consent, 40 female patients with female pattern hair loss were selected. During each sitting, scalp was cleansed, dried and topical anesthetic cream applied. PRP was prepared by double spin method. First centrifugation to separate Plasma and second centrifugation for Platelet concentration. Micro needling with Derma roller was done in affected areas of scalp in a controlled manner in all directions until pin point bleeding is seen. The prepared PRP was applied in those areas of the scalp. Clinical photographs and Grading done before and after procedure for a period of 6 months (4 monthly sittings and 2 months follow-up). Results: Before procedure, according to Sinclair’s scaling, 18.4% of patients had Grade II alopecia (widening of central part) 57.9% had Grade III (widening of central part and thinning on either side), 23.7% had Grade IV (emergence of diffuse hair loss). After procedure, none were in Grade IV, 13.2% had Grade III, 76.3% improved to Grade 2 and 10.5% to Grade I (Normal). 53% patients required 3 sittings to show improvement. Pain (5.3%) was the frequent adverse effect. Conclusion: PRP is a treatment modality that has gained popularity for Alopecia due to its minimal invasiveness, absence of major side effects and more affordable cost compared with hair restoration surgeries. Being an autologous product, the risk of infection and immune rejection is minimized.

**Keywords:** Centrifugation, Micro needling, Alopecia, minimally invasive

**Abbreviations:** PRP, Platelet Rich Plasma

## 1. Background

Female Pattern Hair Loss is a gradual onset, slowly progressive non scarring alopecia, which can be seen any time after menarche but is most common in females aged 20-40 years. It results from a progressive reduction of successive hair cycle time leading to miniaturization of hair follicles<sup>1</sup>.

## 2. Introduction

PRP, known as “Growth Factor Cocktail” is Plasma rich in Growth factors. It is an autologous platelet gel having a large concentration of platelets suspended in a small volume of plasma (1lakh/ $\mu$ L) above the baseline. It is used in alopecia, wound healing and skin rejuvenation<sup>2</sup>. Micro needling<sup>3</sup> is a technique which involves penetration of the epidermis. The epidermal barrier is retained in this procedure. PRP gives a unique power-packed composition of Growth factors contained within alpha granules of platelets act on stem cells in the bulge area of hair follicles to stimulate development of new follicles along with neovascularization.

### 2.1 Aim

To find an effective alternative treatment modality for patients with female pattern hairloss<sup>4</sup> of child bear ingage<sup>7</sup>.

### 2.2 Objective

To assess the efficacy and safety of Platelet Rich Plasma with Derma roller in the treatment of Female Pattern Hair Loss.

### 2.3 Study Approval

Prior to commencement of this study Ethical Committee of the institution has approved the study protocol.

### 2.4 Place of Study

Department of Dermatology-Venereology-Leprosy

### 2.5 Target Population

Patients attending Dermatology outpatient department

### 2.6 Sample Size and Study Design

40 patients diagnosed with Female Pattern Hair Loss were taken under Non-Randomized Prospective Interventional Study.

### 2.7 Study Duration

Study was conducted for a period of 1 year. Selected patients were explained about the duration of treatment-4 monthly sittings and 2 months follow up.

## 2.8 Sampling Method

Convenience sampling

### Inclusion Criteria:

- 1) Females with female pattern hair loss (Sinclair scale-Grade 2 and above)
- 2) Age: 18-50 years
- 3) Patients willing for the procedure and willing to sign informed consent
- 4) Patients willing for follow up and to be photographed

### Exclusion Criteria

- 1) Platelet/Bleeding disorders
- 2) Malignancy
- 3) Keloidal tendency
- 4) Pregnancy and lactation
- 5) Positive viral markers (HIV 1 & 2, Hepatitis B & C) / positive RPR
- 6) Anticoagulant therapy
- 7) Thyroid dysfunction

## 3. Procedure

After routine investigations and informed consent, 40 Female patients (ages 18-50) with female pattern hair loss were selected. Grading of alopecia and Clinical photographs were taken before the procedure by a non-treating dermatologist. During each sitting, scalp was cleansed, dried and topical anesthetic cream applied for 45-60 minutes.

PRP was prepared by double spin method. 10 ml of blood was withdrawn from the patient and 10: 1.5 ml of anticoagulant (acid citrate dextrose) added<sup>5</sup>. First centrifugation was done at 2000 rpm for 10 minutes for separation of plasma. Plasma and buffy coat were separated and extracted. Second centrifuge was done at 3000 rpm for 10 minutes for platelet concentration. Upper 2/3rd (Platelet Poor Plasma) was discarded. Lower 1/3rd (Platelet Rich Plasma) was extracted<sup>6</sup>.

Micro needling with Derma roller (size of 1.5mm microneedle roller-192 needles) was done in the affected areas of the scalp in a controlled manner in longitudinal, vertical and horizontal directions until the end point of visible bleeding is seen. The prepared PRP was applied to those areas of the scalp. Transient erythema is seen post procedure. Ice cold compress was given for soothing effect and to prevent any further bleeding. Patients were asked to wash hair after 24 hours.

On completion of 4 sittings, patients were followed up monthly for a period of 2 months and final grading of the alopecia was done then. Post procedural photographs of the scalp were taken at the end of follow-up period and grading of alopecia was done by the same non-treating dermatologist.

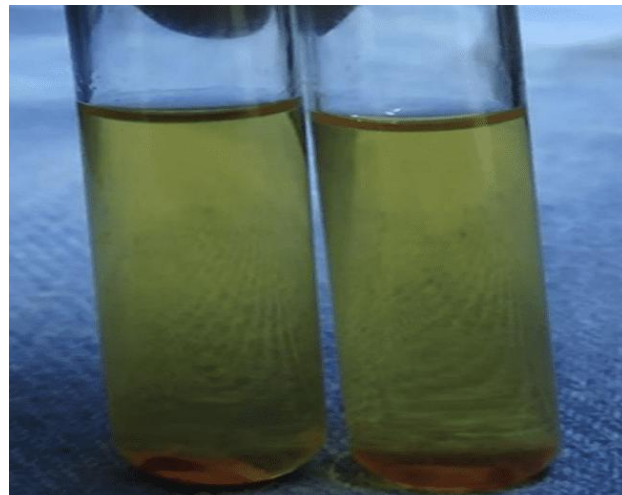


Figure 1: PRP+PPP



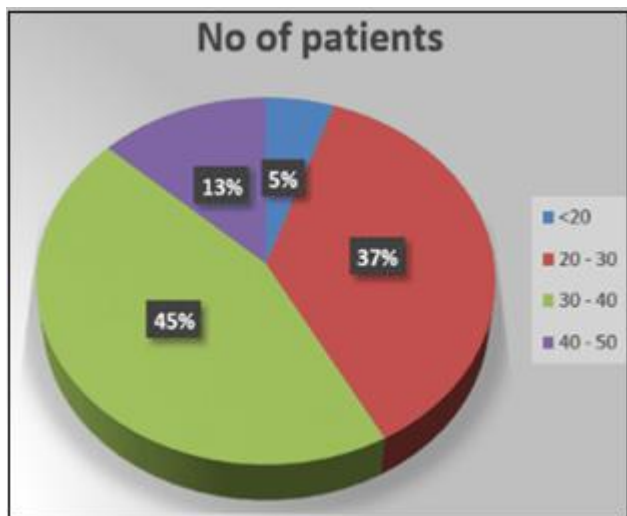
Figure 2: Dermaroller



Figure 3: Platelet Rich Plasma

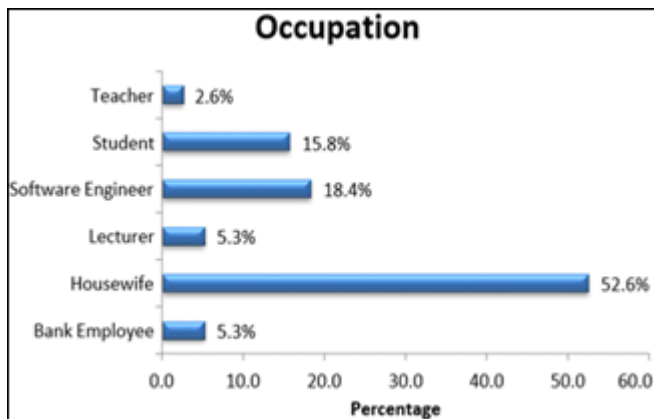
**1.14 Observation**

This study included 40 female patients. Youngest age included was 18 years and the oldest was 46 years. Out of which 2 patients left treatment. One patient left after first sitting and the other patient after 2 sittings. Most of the patients in our study aged between 30 and 40 years.



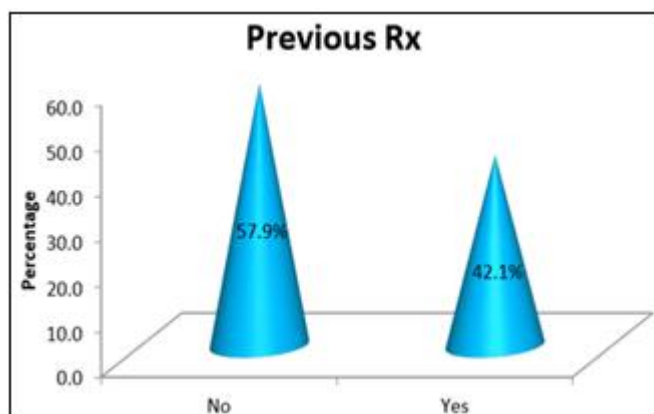
**Chart 1:** Shows age distribution of study population

Majority of our participants were housewives (52.6%)



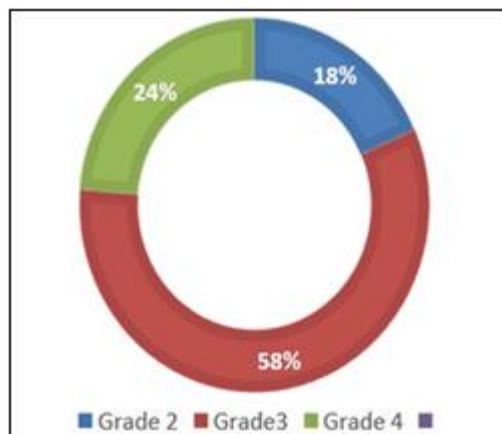
**Chart 2:** Shows occupation distribution of study population

In this study, a majority of 22 patients (57.9%) had not taken any treatment before.



**Chart 3:** Shows previous treatment history

According to Sinclair’s scaling, 18.4% of patients had Grade II alopecia (widening of central part) 57.9% had Grade III (widening of central part and thinning on either side), 23.7% had Grade IV (emergence of diffuse hair loss).



**Chart 4:** Shows the distribution of pattern and grading of hair loss

**4. Results**

**Table 1:** Shows grades of Alopecia before and after treatment

Grade	Before Rx	After 2 sittings	After 6 months
I	-		10.5%
II	18.4%	18.4%	76.3%
III	57.9%	68.4%	13.2%
IV	23.7%	13.2%	-

To summarize, before treatment none of the patients were in grade 1 hair loss and post-treatment 10.5% patients with improved to grade 1.

Before treatment 23.7% patients were in grade 4 hair loss and post-treatment none of the patients retained in grade 4. None of the patients downgraded from their initial grades.

About 87% of patients had improvement in the grade of hair loss after 6 months with better improvement seen after 3 sessions of treatment.

53.5% of patients had improved by two grades (44.44% from Grade 4 to Grade 2 and 9.09% from Grade 3 to Grade 1)

Majority of the patients (73%) had decrease in hair fall after few sessions of treatment.

Increase in number of terminal hairs and increase in diameter of hair shaft were seen in about 85% patients by Trichoscopy.

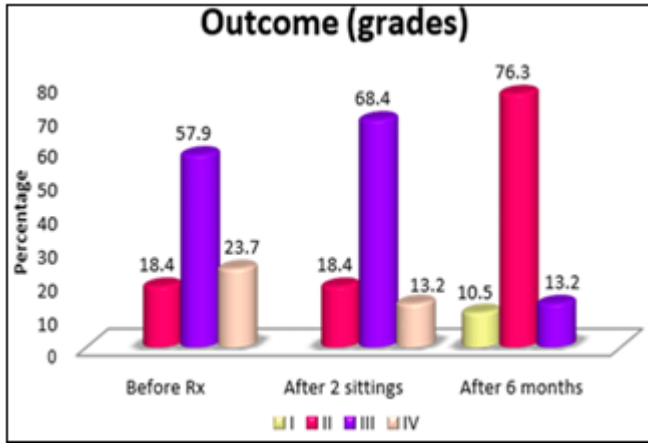


Chart 5: Shows outcome of treatment response



Chart 6: Shows the number of sittings taken to see good improvement

Majority of the patients (53%) required 3 sittings to see good improvement. 42% of patients required 4 sittings to see good improvement.

Good patient satisfaction score was seen only after 6 months in our study.

2 patients showed good improvement after 2 sittings.

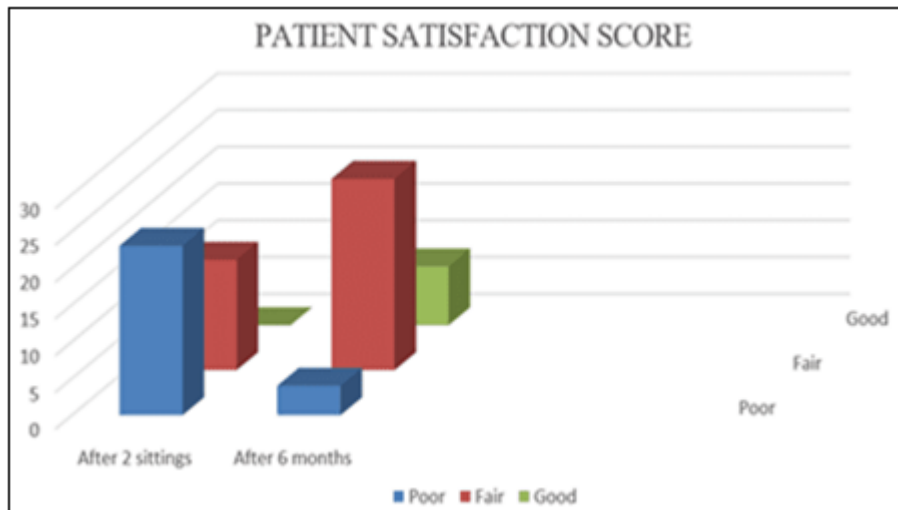


Chart 7: Shows patient satisfaction score

Majority of the patients (84.2%) did not have any adverse effects. Injection site pain was the frequent adverse effect (5.3%).

## 5. Discussion

Platelet rich plasma with micro needling is a novel approach in the treatment of female pattern hair loss<sup>10</sup>. This study is one of the pioneer studies that employ PRP with micro needling in the treatment of Female Pattern Hair Loss. Not many studies are available using this treatment for Female Pattern Hair Loss.

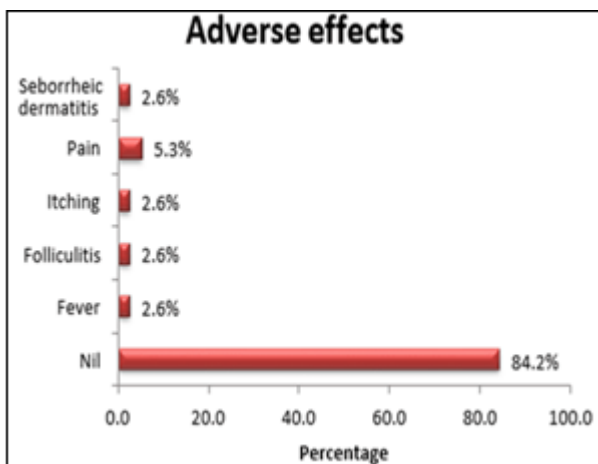


Chart 8: Shows adverse effects during and post treatment

PRP consists of transforming growth factor  $\beta$ , epidermal fibroblast, platelet derived, vascular endothelial and keratinocyte growth factors-which causes hair cell proliferation and perifollicular angiogenesis.

The pain associated with the procedure is directly proportional to the length of the needle used. Pain will also depend on the thickness of epidermis and dermis.

Mechanisms of Micro needling in hair growth are release of platelet derived growth factor, epidermal growth factors are increased through platelet activation and skin wound



regeneration mechanism by activation of stem cells in the hair bulge area under wound healing conditions

In Tawfik et al study<sup>21</sup>, significant statistical difference was noted between PRP and placebo areas when analyzed using both hair density and hair thickness



**Figure 4:** Patient 1 before treatment



**Figure 5:** Patient 1 after 6 months



**Figure 6:** Patient 2 Before treatment



**Figure 7:** Patient 2 After 6 months

A significant improvement in quality of hair and hair volume altogether with a high overall patient satisfaction in PRP-injected sites was observed in global photography.

In Mansuri et al study<sup>22</sup>, patients treated with combination of PRP with minoxidil showed better response (60%) than minoxidil monotherapy (33.33%).

In Jha AK et al study<sup>23</sup>, patients with alopecia showed good response with increase in the number of vellus as well as total hairs, increased diameter of hair shaft. Along with this reduction in yellow dots were appreciated after 3 sessions. Hair pull test was negative after treatment in 14 patients (20 patients).

## 6. Summary

In this study, assessing the efficacy and safety profile of platelet rich plasma therapy with derma roller in the treatment of female pattern hair loss,

The most common age group observed was 30-40 years and the majority of the patients in this study were married.

Maximum duration of hair loss in a patient was 8 years and most patients presented with Sinclair grade 3 pattern of hair loss.

More than half of the patients were housewives. This shows the negative impact of alopecia in the personal lives of these patients even in their fourth decades.

About 42% of patients have undergone treatment before and they seek an effective alternative treatment for hair loss after an unsatisfactory response to other modalities of treatment.

The mean quality of life of the patients improved from 11 to 8 i. e. ; from very large effect on patient's life to moderate effect on patient's life after 6 months.

About 84% of patients did not report any immediate (or) delayed adverse effects. Pain was the frequently reported adverse effect which was temporary. This signifies the safety profile of the procedure.

**Conflicts of interest:** None

**Financial support:** NIL

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