

## An Insight of Platelet Rich Plasma (PRP) Role in Dermatology: Review Article

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### ABSTRACT

**Background:** Platelet-rich plasma (PRP) is a plasma concentrate containing platelets from a patient's own blood. Safety, rapid release of platelet-derived growth factors, autologous preparation, and avoidance of disease transmission from animal to human are some of the benefits that PRP's biological approach may offer. While PRP has been evaluated and proved to be beneficial in a range of orthopedic and maxillofacial injury repair treatments, such as bone grafting and orthopedic surgery, it has also been found to be useful in the treatment of skin conditions.

**Objective:** To characterize platelet rich plasma role in dermatological diseases.

**Methods:** PubMed, Google Scholar and ScienceDirect were searched using the following keywords: Platelet Rich Plasma, PRP, Treatment of skin conditions and Application of PRP in dermatology. The authors also screened references from the relevant literature, between January 1997 and November 2021, including all the identified studies and reviews, only the most recent or complete study was included. Documents in a language apart from English have been excluded as sources for interpretation was not found. Papers apart from main scientific studies had been excluded: documents unavailable as total written text, conversation, conference abstract papers and dissertations.

**Conclusion:** Using higher concentrations of platelets and growth factors, platelet-rich plasma aids in wound healing and tissue regeneration. The number of dermatologists using PRP is steadily rising.

**Keywords:** Platelet Rich Plasma, Treatment of skin conditions.

### INTRODUCTION

Blood is vital to human health because it transports several nutrients and metabolites between different types of cells in the circulatory system. Instead of looking at blood cells as a whole, researchers are instead focusing on individual blood cell components for research. Pure platelet-rich plasma (P-PRP), leucocyte- and platelet-rich plasma (L-PRP), and pure platelet-rich fibrin (P-PRF). A constant release of growth factors can be maintained by P-PRF and leucocyte- and platelet-rich fibrin (L-PRF) because of their high fibrin density<sup>(1)</sup>.

White blood cells contain proteases and acid hydrolases, which can cause inflammation. PRP, on the other hand, is a blood-derived product with a low proportion of leukocytes and a high concentration of platelets<sup>(2)</sup>. Additionally, the chemoattractant, mitogen, and extracellular matrix component synthesising effects of PRP growth factors can help slow down the ageing process of the skin. Although PRP has previously been tested for its use in orthopedic surgery, bone grafting, and the healing of musculoskeletal and craniofacial injuries, a high number of dermatological conditions has shown that it is practical and efficacious<sup>(3)</sup>.

### Application of PRP in dermatology:

#### A) Facial rejuvenation:

The need for a youthful-looking face has led to a surge in the usage of PRP in facial rejuvenation treatments. PRP treatment was found to be an excellent alternative for regenerating the infraorbital area in tests involving 20 Asian women. Autologous PRP appears to be safer and more effective for skin rejuvenation than manufactured growth factors, even though PPP and normal saline can be delivered swiftly and safely<sup>(4)</sup>.

#### B) Facial wrinkles:

In some cases, PRP injection might have a positive effect on the appearance of facial wrinkles. In a study including a total of 20 people, each with varying degrees of facial wrinkles<sup>(5)</sup>. One intradermal injection of PRP resulted in the assessment of all individuals for one to eight weeks on numerous professional scales. In the end, the final score was much greater than the baseline, wrinkles in particular, the nasolabial folds and the less severe grades. Only skin inflexibility-sagging was found to have a substantial effect on self-assessed appearance in a similar study; this was only found to be the case for skin inflexibility<sup>(6)</sup>.

#### C) Striae distensae:

When pregnant, women are more likely to suffer from stress-related conditions like striae distensae that form on their abdomens and buttocks, as well as their thighs and legs. No treatment has sufficient proof to be totally successful without adverse effects, including topical drugs, fractional laser, and so on. According to a clinical and histological study including 68 patients, PRP injection is superior to microdermabrasion alone in treating striae distensae, and the two therapies combined are even more successful. An injection of PRP three months later revealed that the elastic fibres had grown in number, length, and thickness<sup>(7)</sup>.

#### D) Hair:

##### I- Androgenic alopecia (AGA):

There have been various clinical trials on PRP as a potential therapeutic treatment. Twenty male patients

were examined in a comparative study on the effects of PRP injections on AGA<sup>(8)</sup>. A rise in both the total number of hairs and their density was seen after three treatment cycles.

The same effect was again demonstrated through other clinical investigations<sup>(9)</sup>. The research indicated that a comparison of 12 men and 13 women using a saltwater solution resulted in statistically significant increases in the number of hairs in anagen or telogen as well as hair density. However, only the mean total density differed significantly from the control group<sup>(10)</sup>.

### **2- Alopecia areata (AA):**

Promising results were found in the treatment of AA using PRP<sup>(11)</sup>. In the treatment of AA, a recent study including 90 patients compared the efficacy of PRP with topical minoxidil 5 percent. Despite both groups experiencing significant increases in hair growth, those who received PRP treatment experienced faster hair growth and better hair quality. There has been evidence that PRP, a novel treatment for hair loss, increases hair growth<sup>(12)</sup>.

### **3- Follicular unit extraction hair transplant:**

Hair transplants are becoming increasingly popular due to an uptick in demand. Follicular unit extraction and follicular unit transplant are the two most common methods of hair transplantation. The popularity of follicular unit extraction has grown in recent years because of its reduced invasion, but there are still certain adverse effects to deal with following the procedure. One of the most recent studies involved the transplantation of 40 follicular unit extractions (FUEs). PRP-treated and non-PRP-treated subjects were separated into two groups. Hair growth, graft density, redness around the transplant area, and activity in latent follicles were all assessed after a six-month treatment. FUE hair transplantation can benefit from intraoperative PRP therapy, which can speed up hair growth and skin regeneration, reduce catagen loss, and awaken dormant follicles<sup>(13)</sup>.

### **E) Scars:**

Scar tissue can be improved through fat grafting and laser treatment, for example. The opposite appears to be true with PRP, which appears to have a synergistic impact on healing. In a clinical experiment including 60 patients with traumatic scars on various parts of the body, the efficacy of three treatments, including fat grafts, nonablative lasers, and platelet-rich plasma (PRP), was studied<sup>(14)</sup>. Combining these three methods proved to be the most successful. For atrophic and contractile scars, a combination of ablative laser CO<sub>2</sub>, platelet-rich plasma (PRP), and autologous fat transplantation appears to work well<sup>(15)</sup>.

The physical and psychological effects of acne scars have become more common in recent years because so many people have suffered from the condition. PRP

intra dermal injections were tested for the first time in the treatment of atrophic acne scars, and the results were encouraging<sup>(16)</sup>. Acne scars are receiving greater attention to the use of PRP<sup>(17)</sup>. Microneedling mixed with autologous PRP, and distilled water is more successful in reducing atrophic acne scars than distilled water alone<sup>(17)</sup>.

### **F) Vitiligo:**

Since its first usage in 1997, narrowband-ultraviolet B (NB-UVB) phototherapy has been more popular as an effective and safe treatment for vitiligo. Long-term treatment, however, raises the possibility of adverse effects and noncompliance on the part of patients<sup>(18)</sup>. The treatment of 20 patients with vitiligo by 10 sessions of intra dermal injection of PRP with a one-week interval was described in an experiment at the Official 1<sup>st</sup> International Pigment Cell Conference 2011, which found no effect. In a study of 60 stable patients with vitiligo, it was found that NB-UVB therapy alone on one side and NB-UVB therapy combined with intra dermal injection of PRP on the other side resulted in a quicker time to repigmentation than the previous study. In treating vitiligo, PRP appears to be a beneficial alternative therapy, although issues such as limited patient samples, a lack of controlled clinical trials, and short follow-up periods mean there is insufficient proof for this claim<sup>(19)</sup>.

### **G) Synergistic effect with fractional CO<sub>2</sub>:**

Patients' daily lives may be affected by the lengthier downtime and higher incidence of extended erythema and prolonged erythema with ablative carbon dioxide fractional resurfacing than with nonablative laser treatment. Fractional resurfacing patients benefit greatly from the use of platelet-rich plasma (PRP) to speed wound healing and minimize short-term negative effects<sup>(20, 21)</sup>.

22 Korean women participated in a study that was separated into two treatment groups (PRP and non-PRP). For the dermo-epidermal connection length, collagen content, and number of fibroblasts were all considerably better than those in the control group<sup>(21, 22)</sup>. Randomized controlled trials (RCTs) on 13 more facially aged women examined PRP and ultra-pulsed fractional CO<sub>2</sub> lasers. To compare the experimental and control groups, wrinkles on the skin and the duration of erythema and edema were considerably reduced in the experimental group<sup>(21, 23)</sup>.

### **CONCLUSION**

With a high concentration of platelets and growth factors, platelet-rich plasma aids in wound healing and tissue regeneration. The number of dermatologists using PRP is steadily rising

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