

# Clinical Outcomes and Patient Satisfaction of Platelet-Rich Plasma Injections in Regenerative Aesthetic Medicine

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## Abstract

Regenerative medicine is a growing interdisciplinary domain within biomedical research that seeks to restore, regenerate, and substitute impaired tissues and cells. Platelet-rich plasma (PRP) is an emerging therapeutic modality in the field of regenerative medicine, which has garnered considerable attention for its capacity to facilitate and expedite tissue healing processes. Despite the availability of various conventional therapeutic approaches focusing on wound healing and growth factors, the use of new treatments remains a clinical challenge. Hence, the current study aims to investigate the field of regenerative skin wound healing, with a specific focus on the use of platelet-rich plasma (PRP) and establish a meaningful connection between clinical outcomes and patient satisfaction, while also exploring the properties and potential advantages of PRP. This qualitative study included fifteen patients from medical spas and clinics in Orlando, Florida, who had received PRP treatments within the last two years. The data, obtained through semi-structured interviews, were analyzed by conventional content analysis using Graneheim and Lundman's approach (2004). Finally, data analysis identified three major categories: clinical outcomes, patient satisfaction, and quality of life. Improvement in facial texture and hair quality was found to be a significant predictor of positive clinical outcomes, and higher levels of self-esteem and a positive outlook on the aging process were strong indicators of improved quality of life. The present study offers empirical evidence that substantiates the positive patient satisfaction scores and the strong safety profile that are commonly linked with Platelet-Rich Plasma (PRP) injections. Therefore, based on our analysis, we consider Platelet-Rich Plasma (PRP) to be a viable and reliable therapeutic approach for addressing conditions such as alopecia, acne scars, and skin rejuvenation.

## 1. Introduction

The skin, being the largest organ, plays an important role in defense and survival due to its inherent ability to repair and renew itself [1]. It acts as an essential barrier, safeguarding the inner environment from the outer environment [1]. A disturbance of the normal anatomical structure and functional integrity of the skin is characterized as a wound [1]. Wound healing is a coordinated dynamic process in which different types of cells, growth factors, cytokines, and chemokines work together [2].

With the notable progress in medical care and nutrition, there is an increasing imperative to devise innovative approaches aimed at enhancing the process of cutaneous wound healing [3]. The field of medicine is currently experiencing rapid progress in the direction of developing procedures that are minimally invasive or non-invasive, as well as treatments that can expedite the

healing process [3]. These advancements aim to minimize the negative impact on patients' health and enhance their ability to regain normal bodily functions, leading to an improved quality of life [3].

Regenerative medicine is a growing interdisciplinary domain within biomedical research that seeks to restore, regenerate, and substitute impaired tissues and cells [4]. Platelet-rich plasma (PRP) is an emerging therapeutic modality in the field of regenerative medicine, which has garnered considerable attention for its capacity to facilitate and expedite tissue healing processes [5]. PRP is defined as an autologous serum with platelet concentrations that promotes bioactive proteins and growth factors that stimulate collagen production and wound-healing [3]. It is derived from the patient's blood, and after centrifugation, a plasma fraction with a higher platelet

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concentration is obtained [6]. Platelets are essential contributors to the wound healing process due to their hemostatic function and the presence of cytokines and growth factors [7].

The use of PRP continues to develop as an effective treatment for acute and chronic wounds in a variety of medical specialties [8]. It has been used for decades in cardiac surgery, oral surgery, orthopedics, and facial plastic surgery, and it continues to evolve as a versatile therapy in dermatology [9]. Regardless of the existence of various conventional therapeutic approaches focused on wound healing and growth factors, the utilization of innovative treatments continues to pose a clinical challenge. There is an ongoing pursuit of regenerative therapies to reduce the burden on healthcare systems. Clinical and experimental research on wound regenerative therapies such as PRP and stem cells is yielding promising results. For these reasons, the current study seeks to examine the field of regenerative skin wound healing, with a specific focus on the use of platelet-rich plasma as a cost-effective and safe therapeutic intervention that enhances the overall quality of life for patients.

## **2. Literature Review**

### **2.1. PRP: Process and Preparation**

Platelet-rich plasma (PRP) is a plasma fraction that exhibits a concentration of platelets that is 3 to 7 times higher than that found in whole blood [10]. The process involves gathering around 10–60 mL of peripheral blood the same day of treatment. Anticoagulants are commonly incorporated into protocols in order to mitigate the occurrence of coagulation and premature release of alpha granules. The PRP preparation was obtained via a single centrifugation of whole blood. Following the aspiration of the platelet-poor plasma, the remaining plasma was carefully transferred with a pipette to separate the platelets from the separation gel's surface. The filter column was then inserted into the separation syringe, removing the debris and filtering PRP [11].

### **2.2. PRP in Aesthetic Medicine: Efficacy and Safety**

Platelet-rich plasma (PRP) is a plasma fraction with high concentrations of platelets and growth factors and categorized by the Food and Drug Administration (FDA) as an autologous blood product [12]. The utilization of PRP in both humans and animal subjects is increasing, and its wound healing properties have been reported in multiple clinical and experimental studies involving dogs, horses, and humans [13 - 15].

There is a growing interest among dermatologists regarding the potential application of platelet-rich plasma (PRP) in multiple cutaneous disorders due to its ability to facilitate tissue remodeling and promote healing in various tissues [10].

The application of platelet-rich plasma (PRP) in the treatment of skin rejuvenation and acne scars is experiencing a notable surge in popularity due to its efficacy and favorable safety profile in enhancing texture, tone, and early indications of aging [16]. PRP injections resulted in significantly greater improvements in skin texture, wrinkles, and dermal collagen compared to saline injections [16]. Another study assessed the patients' physical

appearance and found a 25% improvement [17]. The side effects of the PRP treatment were found to be minimal to mild and well-tolerated [17]. Furthermore, a single PRP injection is well tolerated and capable of rejuvenating the face and significantly reducing wrinkles [17].

Several studies have investigated the potential effects of platelet-rich plasma (PRP) in the treatment of Androgenic alopecia (AGA) in males, resulting in promising results [18]. Additionally, similar studies have explored the efficacy of PRP in a female population affected by female androgenetic alopecia (FAGA) [19, 20]. Androgenic alopecia (AGA) is a prevalent and progressive condition characterized by hair loss in both males and females, affecting approximately 80% and 50% of the population, respectively. Platelet-rich plasma (PRP) therapy has been identified as a viable treatment modality for AGA [21]. According to a study conducted the effectiveness of platelet-rich plasma (PRP) was demonstrated through a significant 42.8% enhancement in hair density following a six-month treatment period [22]. Interestingly, most previous studies found that PRP is more effective when combined with topical therapies such as Procapil, saw palmetto (SP), and biotin, as opposed to PRP alone. The therapies mentioned above have the potential to stimulate hair growth by regulating the hair cycle while also preventing progressive hair loss [21].

### **2.3. PRP and Combination Therapies: Lasers and Microneedling Technique**

PRP applications for hair restoration and skin rejuvenation continue to be the most well-supported indications in aesthetic dermatology [23]. When combined with other treatment modalities such as dermal lasers and other devices, PRP shows significant improvements in skin appearance, texture, and tone [23].

Three studies investigated the use of PRP in combination with the micro-needling technique, which demonstrated notable efficacy in the treatment of acne scars and facial aging [24 – 26]. Ibrahim et al. (2017) conducted a study to assess the impact of micro-needling and PRP, both individually and in combination, on a group of 90 patients. A statistically significant enhancement was observed in the group receiving both platelet-rich plasma (PRP) and micro-needling, as compared to the group receiving PRP and micro-needling alone. Additionally, there was a statistically significant difference in patient satisfaction between the combination group and the groups receiving PRP and micro-needling alone. The efficacy and safety of combination therapy in the treatment of atrophic scars of various causes, with minimal downtime and cost-effectiveness, are suggested by the authors. In another study, 24 subjects with atrophic acne scars were compared to a combination of PRP and microneedling versus microneedling and trichloroacetic acid peeling. Both combinations improved acne scars significantly, but there was no significant difference in epidermal thickness measured histologically. Although both combination techniques were effective, subjects preferred micro-needling with TCA to micro-needling with PRP for acne scars [25]. Asif et al. (2016) evaluated the combined effectiveness of platelet-rich plasma (PRP) and

micro-needling in treating atrophic acne scars in a sample of 50 patients. According to Goodman's study, both qualitative and quantitative scales demonstrated significant improvements when employing micro-needling alone or in conjunction with platelet-rich plasma (PRP) and micro-needling. There existed a disparity between the two treatment modalities. Significant differences were observed in patient satisfaction scores between the groups receiving platelet-rich plasma (PRP) and micro-needling, as well as micro-needling alone. The authors posit a hypothesis that the harm caused by micro-needling is remedied through the healing mechanism of activated platelets, cytokines, and growth factors derived from PRP in combination therapy.

Studies have shown that laser treatment combined with platelet-rich plasma (PRP) yields exceptional outcomes in the treatment of acne scars and facial aging. The efficacy of CO<sub>2</sub> laser treatment in conjunction with PRP was reported in four studies [27–30]. A clinical study conducted by Na et al. (2011) demonstrated that the application of PRP in conjunction with ablative fractional carbon dioxide laser resulted in decreased erythema and expedited the healing process. Al Taweel et al. (2018) conducted a study to assess the effectiveness of Platelet-Rich Plasma (PRP) combined with carboxytherapy compared to PRP combined with fractional CO<sub>2</sub> laser treatment in a group of 40 patients with atrophic acne scars. The combination of platelet-rich plasma (PRP) and CO<sub>2</sub> laser treatment demonstrated a distinct improvement in acne scars when compared to the combination of PRP and carboxytherapy treatment. Nevertheless, it was noted that carboxytherapy exhibited a lower incidence of adverse effects compared to CO<sub>2</sub> treatment, making it a potentially advantageous curative approach for acne scars. Kar et al. (2017) observed substantial enhancements on both facial sides following the implementation of a combination therapy involving fractional CO<sub>2</sub> laser treatment, platelet-rich plasma (PRP), and CO<sub>2</sub> treatment for atrophic acne scars. These improvements were evaluated using the Goodman and Barons quantitative global acne scar grading system. However, no statistically significant distinction was found between the right and left sides of the face. The researchers reach the conclusion that the administration of platelet-rich plasma (PRP) treatment leads to a notable decrease in both the duration of downtime and the inflammation induced by laser treatment. Zhu et al. (2013) assessed the effectiveness and safety of erbium fractional laser therapy in conjunction with platelet-rich plasma (PRP) for the treatment of acne scars. 22 subjects were administered combination therapy, resulting in a significant improvement of over 50% in 90.9% of the patients. Additionally, a high level of treatment satisfaction was reported by 91% of the patients. The evaluation was conducted through the comparison of photographs taken before and after the treatment of the patients. According to the findings, the combination therapy demonstrates both effectiveness and safety in generating synergistic advantages for the management of acne scars.

Combining PRP with laser therapies and microneedling improves wound healing, shortens recovery times, and reduces erythema and melanin index of treated areas [31]. When compared to microneedling alone, combined treatment with microneedling and PRP was associated with a greater likelihood of clinical

improvement of more than 50% on Goodman's qualitative scale [32].

#### **2.4. PRP as a Treatment Option: Perceptions and Satisfaction**

Long-term effects on the patient's overall well-being can be directly linked to their reflection, and their appearance is an important factor in their overall health [33]. PRP therapy was well received by 57% of male patients and 43% of female patients, with an average score of 7.29 on a scale from 0 to 10 [34]. The use of PRP as a therapeutic intervention for male and female pattern hair loss has yielded favorable outcomes, as evidenced by the high satisfaction ratings reported by patients [34]. Moreover, this autologous treatment approach can be regarded as a reliable and effective modality [34].

Improvements in quality of life (QoL) were meaningful after PRP injections [35]. These changes were more significant in physical domains including role limitation due to physical health, pain, and overall physical functioning [35].

### **3. Method**

Platelet-rich plasma (PRP) is an emerging and promising treatment in the field of regenerative medicine. It has attracted considerable attention for its capacity to improve and expedite tissue healing. However, as far as we know, no research has yet examined the impact of PRP on clinical outcomes, patient satisfaction, and quality of life. The objective of this project is to evaluate the factors that impact the clinical outcomes of PRP injections, identify the factors that influence patient satisfaction with PRP injections, establish a connection between PRP treatment and patients' overall quality of life, and propose future research directions and perspectives based on the obtained results. Three research questions are proposed.

**RQ1:** Does platelet-rich plasma (PRP) treatment have a positive impact on clinical outcomes in regenerative aesthetic medicine?

**RQ2:** Does platelet-rich plasma (PRP) treatment increase patient satisfaction and the overall patient experience?

**RQ3:** Does platelet-rich plasma (PRP) treatment have a significant impact on improving patients' quality of life (QoL)?

#### **• Design**

A qualitative descriptive interview study with an inductive approach.

#### **3.1. Setting and Sample**

The screening section of the interview consisted of participants from medical spas and clinics located in Orlando, Florida. The study included adult patients who had undergone PRP treatments within the past two years and were fluent in English. Patients who were unable to provide verbal or written consent were excluded from the study.

A purposive sample was employed to ensure a diverse range of ages and genders. The patients were identified and invited to participate by one of the authors. A total of 20 patients were extended invitations, and 15 of them agreed to participate.

Inclusion Criteria	Exclusion Criteria
Adult (age $\geq$ 18 years)	Individuals treated with anticoagulant medications
Individuals with dermatological conditions (alopecia, acne, psoriasis, wrinkles, etc.)	Pregnancy or breastfeeding
Individuals who received PRP $\leq$ 2 years in duration	Individuals with an active infection
Oral/written informed consent	Individuals exhibit anemia

**Table 1: Criteria for the Inclusion and Exclusion of Studies**

### 3.2. Data Collection

The interview guide was developed by the research group in accordance with the study's objective. The interviews were conducted using a semi-structured qualitative approach, incorporating open-ended questions in the interview guide (See Appendix 1). The guide consisted of a total of eighteen primary questions organized into four sections: screening, demographic, clinical, and perception.

The researcher provided a digital version of the consent form to the participants one week before the scheduled interview. The consent form presented a detailed explanation of the research, including its terms, protocols, and the need to collect personally identifiable information (PII) such as name, contact information, age, and ethnicity.

At the beginning of the interviews, the participants were instructed to provide verbal consent and were asked if they had any questions regarding the form. Following that, the researcher started by asking some general questions to get to know the patients and establish a comfortable and stress-free environment. Then, more specific questions aimed at the study's objective were asked.

The interviews were conducted virtually or over the phone

between January and February 2024. There were no audio or video recordings made. The interviews ranged from 15 to 40 minutes, with an average duration of 33 minutes. The author responsible for the study (IB) securely stored and safeguarded personal data.

### 3.3. Data Analysis

An inductive content analysis, following Graneheim and Lundman's approach (2004), was used to capture the patients' experiences [36]. The data were analyzed qualitatively in five stages: 1) transcribing the entire interview transcript verbatim, 2) reading the entire text to get a general sense of the content, 3) identifying meaning units relevant to the objective, 4) condensing meaning units into codes to summarize the essence of the sentences, and 5) classifying similar codes into more comprehensive categories (Table 2).

The analysis was primarily conducted by the first author (IB) with input and reflective feedback from the last author (TZ). The generated codes were deliberated and refined until consensus was achieved by all authors, each contributing their unique viewpoints. Authors often utilize selected quotations from interview transcripts to illustrate the connection between findings and data, [36].

Interview Text	Condensed meaning unit	Code
"I like how my scalp looks and how my hair is growing. My hair looks very different in the pictures I took before and after."	The before and after pictures show a significant improvement in hair quality.	Improved hair quality.
"At first, I had second thoughts...I was tempted to try the process after seeing it online."	There are noticeable changes following the second visit, resulting in enhanced confidence.	Increased self-esteem.

I noticed changes after my second visit and felt better about myself...I can leave my house without any hat or scarf now."		
"...after just a couple of days, the results of my treatment were obvious...my face looked better, and my bumps went away."	The treatment improved the face and removed the bumps.	Enhanced facial texture.

**Table 2: Examples of Interview text, Condensed Meaning Unit, and Codes. Data from the Actual Interview**

Patient satisfaction scores and clinical outcomes were assessed following their final treatment. Patients were requested to evaluate their satisfaction with the PRP treatment using a numerical rating scale by answering the question (How satisfied are you with your PRP treatment results? 0 = not satisfied at all; 10 = extremely satisfied). Patients were requested to assess the clinical outcomes and quality of life following the use of PRP (Has PRP improved your quality of life? Improved, the same, or worsened), and the collection of negative effects and serious adverse events.

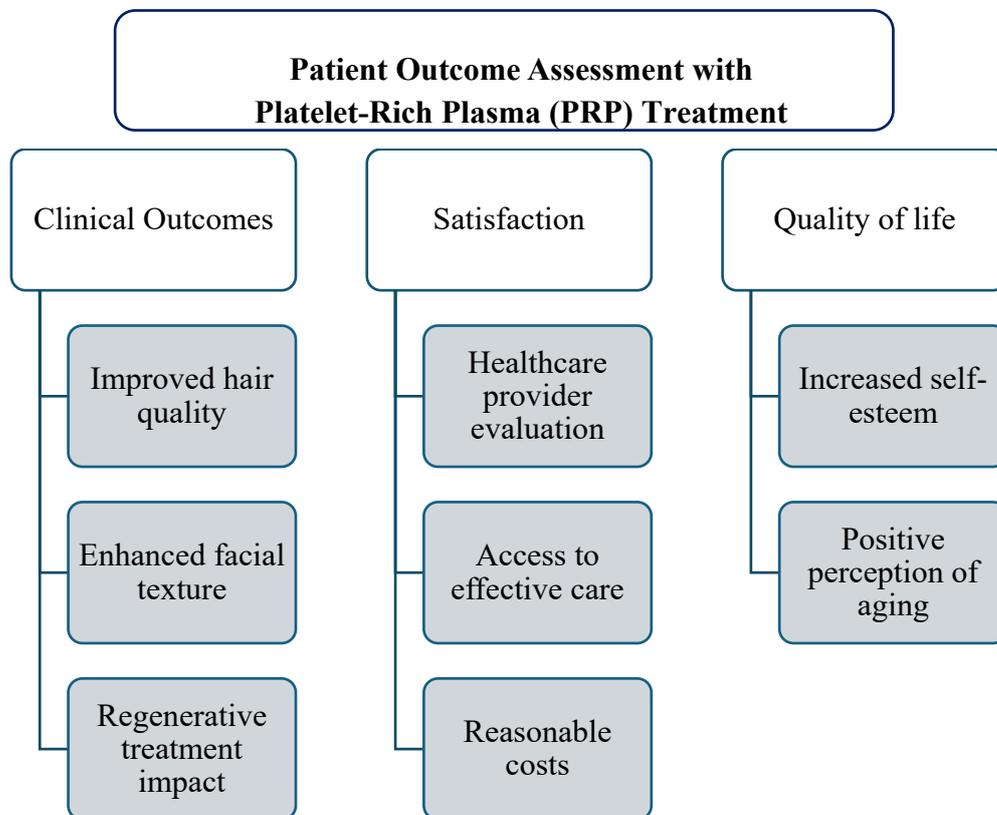
### 3.4. Ethical Considerations

The study was approved by the Institutional Review Board

(STUDY00005962). The participants were provided with study information and a consent form one week prior to the scheduled interview. The study information placed significant emphasis on the voluntary nature of participation and the assurance of confidentiality. Prospective participants were asked about their preferred method of interview, either virtual or phone. Prior to the interview, each patient verbally agreed to participate in the study.

### 4. Results

The demographics of the participants included in this study are shown in Table 3.



**Figure 1: The Patient's Experience with Platelet-Rich Plasma (PRP) Treatment, Classified into Three Categories**

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Data analysis resulted in eight open codes divided into three main categories. The main categories included factors influencing positive outcomes, patient satisfaction, and quality of life after platelet-rich plasma injections.

**4.1. Clinical Outcomes of Platelet-rich Plasma Injections:** This category refers to the assessment of effectiveness based on the desired treatment outcome. It consists of three subcategories: improved hair quality, enhanced facial texture, and regenerative treatment impact.

**4.1.1. Improved Hair Quality:** A contributing factor to the positive outcomes of platelet-rich plasma injections in alopecia patients was the improved growth of hair. Patients reported that PRP had positive effects on hair density, thickness, and scalp health, which subsequently influenced their decision to continue the treatment based on the significant improvements observed.

**4.1.2. Enhanced Facial Texture:** The PRP treatment was accompanied by patient feedback indicating reduced sagging, skin rejuvenation, and wrinkle reduction. One contributing factor was the combination of platelet-rich plasma (PRP) and the micro-needling technique, which resulted in an enhancement of the facial texture quality.

**4.1.3. Regenerative Treatment Impact:** The ability of platelet-rich plasma injections to naturally promote the body's healing process may have contributed to patients' positive outcomes. These injections have helped to reduce inflammation, relieve pain, and restore function.

“PRP have really helped... I am so grateful that my pain level and mobility have both improved... Had the PRP injections done here in my right knee, and now my hair... really a natural way to avoid surgery in the end.” (Patient 2).

**4.2. Patient Satisfaction with Platelet-Rich Plasma Injections:** The patient's satisfaction and perception towards the treatment are influenced by specific factors. These factors include the healthcare provider evaluation, access to effective care, and reasonable costs.

**4.2.1. Healthcare Provider Evaluation:** The patient's trust in various individuals, such as the treatment team, the physician's expertise, or the clinicians' competence, contributed to the patient's overall confidence in the well-organized and transparent transition of their PRP treatment. Patients experienced a sense

of direction towards the correct decision after engaging in discussions with healthcare providers or receiving the clinician's expert opinion.

**4.2.2. Access to Effective Care:** This includes the patient's experience and structural factors such as the length of waiting period, the level of coordination among the treatment team, the influence of personalized care, the incidence of medical errors during treatment, and the level of commitment displayed by the healthcare personnel.

**4.2.3. Reasonable Costs:** Various patient-reported outcomes were collected, indicating that they were satisfied with the robustness of the results and believed the procedure was worth the cost. The cost of a single PRP treatment is relatively low (ranging from \$200 to \$1,500, according to Florida estimates). Patients claimed that investing in verified and essential PRP treatments associated with improved outcomes had a significant impact on their satisfaction.

**4.3. Quality of Life of Patients Following Platelet-Rich Plasma Injections:** Quality of life (QoL) refers to an individual's subjective evaluation of their overall life circumstances, including goals, expectations, values, and personal concerns. The study identified two primary factors that influence quality of life: physical functioning, which is associated with the perception of aging, and social functioning, which reflects an increase in self-esteem.

**4.3.1. Increased self-esteem:** Patients express feelings of increased self-esteem and confidence after receiving PRP treatments. The purpose of hair loss or facial treatments extends beyond vanity. These treatments have the potential to improve an individual's self-perception and boost their desired confidence, ultimately improving their overall quality of life.

**4.3.2. Positive Perception of Aging:** The patients conveyed their contentment with PRP facial treatments as a viable choice for combating the effects of aging and revitalizing the skin. They asserted that it alleviated noticeable indications of aging and enhanced their overall well-being.

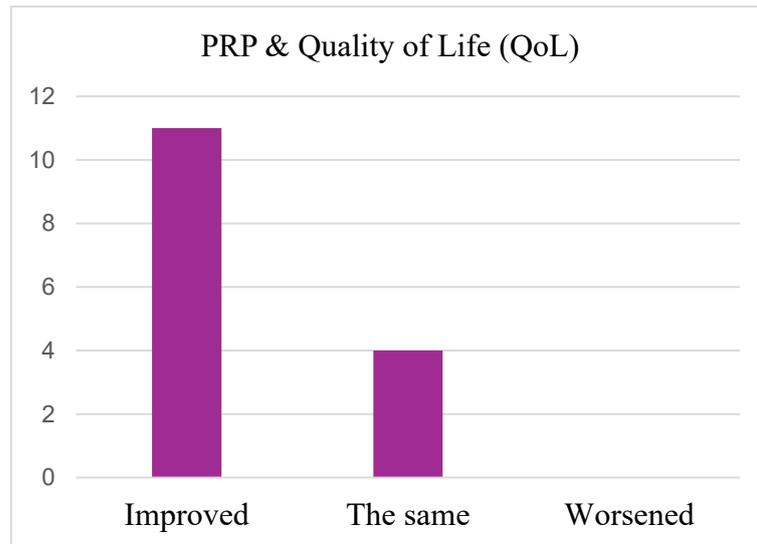
“I have undergone PRP injections and PRP microneedling in the past, and I continue to maintain these treatments to achieve a more youthful skin... I like that the treatment is natural and uses your body's own components to make your skin look younger from the inside out.” (Patient 5).

Variables				
Gender, n (%)				
Male		4	(27.0)	
Female		11	(73.0)	
Age, median years (min-max)		35.9	(23-57)	
Number of PRP treatments (min-max)		3.1	(1-6)	
Type of condition, n (%)				
Alopecia (A)		5	(33.0)	
Skin Rejuvenation (SR)		3	(20.0)	
Acne Scarring (AS)		7	(47.0)	
Individual patient demographics				
Participant number	Gender	Age	Number of PRP treatments	Type of condition
1	Male	57	3	A
2	Male	36	4	A
3	Female	42	7	SR
4	Female	45	6	A
5	Male	31	6	A
6	Female	54	3	AS
7	Female	43	3	AS
8	Female	28	1	SR
9	Female	26	2	AS
10	Female	34	1	SR
11	Female	31	1	AS
12	Male	29	6	A
13	Female	27	2	AS
14	Female	32	3	AS
15	Female	23	3	AS

**Table 3: Participant Demographics (N = 15)**

The mean age of the fifteen patients was 35 years, ranging from 23 to 57 years. 27% of the patients were male, while 73% were female. PRP was used to treat alopecia in five patients, acne

scarring in seven patients, and for skin rejuvenation in three patients. Patients received an average of three PRP treatments at 4-week intervals, and no adverse events were reported.



**Figure 2:** *Patient's Assessment of their Quality of Life Following Platelet-Rich Plasma Treatment*

In total, the patients were satisfied with the treatment outcomes. The mean score was 8.07 on a scale ranging from 0 to 10, with males scoring an average of 8.75 and females scoring an average of 7.82. Eleven patients reported improvements in their quality of life following PRP treatment, while four patients indicated no change (Figure 2).

## 5. Discussions

The objective of this study was to evaluate the various factors that impact the clinical outcomes of platelet-rich plasma (PRP) injections, identify the factors that play a role in patient satisfaction with platelet-rich plasma (PRP) injections, and assess the factors that contribute to the significant improvement in patients' quality of life (QoL) through platelet-rich plasma (PRP) treatment.

The primary clinical outcomes of platelet-rich plasma (PRP) treatment were determined by conducting clinical evaluations of patients using subjective and objective assessments, as well as examining changes in physical appearance at 12- and 24-weeks post-treatment. The reported outcomes included a general enhancement in the visual characteristics of acne scars among individuals with acne, an improvement in the visual appearance of individuals with photoaged skin and texture among those undergoing skin rejuvenation, and a significant clinical improvement in hair growth and thickness among patients with alopecia following treatment. The results obtained were subsequently condensed, resulting in improved hair quality and enhanced facial texture. Additionally, it was observed that a two-three series of PRP injections was effective in approximately 60% of individuals diagnosed with alopecia, 43% of individuals experiencing acne scarring, and 33% of individuals undergoing skin rejuvenation. These findings were consistent with previous research, which found that PRP is a safe and effective treatment option for hair loss and that it improves hair density and thickness in men and women with androgenetic alopecia [37, 38].

Our study aligns with current literature by demonstrating a

high level of patient satisfaction and positive clinical ratings. On a scale ranging from 0 to 10, the mean score for patient satisfaction in platelet-rich plasma (PRP) treatment for alopecia, acne scarring, and skin rejuvenation was found to be 8.07. Previous studies on platelet-rich plasma (PRP) and androgenetic alopecia (AGA) employed a numerical scale ranging from 0 to 10. An investigation revealed that the mean patient satisfaction score was 7.1 on a scale of 10 [39], while another study reported a score of seven out of 10 [40].

The study identified two significant subcategories: healthcare provider evaluation and access to effective care. The implications of our findings are significant for clinical practice and are applicable to individuals seeking to uphold and enhance patient satisfaction following treatment in their professional setting. Given that the interpersonal skills of healthcare providers and the provision of effective care were identified as significant factors influencing patient satisfaction, our findings suggest that enhancing communication skills could be crucial for improving patient satisfaction. Previous studies have highlighted the significance of personnel presence and their effective communication with patients [41]. Communication is a crucial and indispensable element in the provision of information, support, and care, all of which collectively contribute to the achievement of an effective treatment outcome [42]. Based on the perspective of patients and their satisfaction ratings, it is imperative for clinicians to possess a comprehensive understanding, consciousness, intellect, and proficiency in order to deliver care that is both effective and efficient, while also achieving desired outcomes [42]. Patients also cited reasonable cost as a factor influencing their satisfaction with the PRP treatment. It is more economically efficient in comparison to hair restoration surgery [43].

Considering the perspective of health economics, this study found that a single PRP injection had an average cost of \$200. Therefore, the total cost of three injections would amount to \$600. Prices for PRP therapy can vary significantly across

different clinics and hospitals in Florida, ranging from around 200 to 1500 US dollars. The cost is determined by factors such as the type of PRP-preparing kit used. It's important to note that these expenses are not typically covered by the health insurance system in Florida. Considering the variations in health insurance systems across countries, clinicians may find it beneficial to explore PRP therapy as a conservative treatment option. This is especially relevant for patients with mild to moderate dermatological conditions, those who are not suitable candidates for surgery due to their young age, or individuals with high-risk comorbid conditions like cardiovascular disease [11].

In this study, it was observed that self-esteem had significant direct influence on quality of life. Considering the significant relationship between quality of life and self-esteem, it is imperative for healthcare providers to give particular focus and implement timely interventions in platelet-rich plasma (PRP) treatment. A study conducted by Meyers et al. (2023) examined the level of self-confidence in patients receiving PRP treatment. The study revealed favorable results in terms of patient-reported quality of life, specifically in terms of self-esteem.

## 6. Conclusions

Platelet-rich plasma (PRP) exhibits advantageous influences on alopecia, acne scarring, and skin rejuvenation. This study demonstrates the significant capacity of PRP to produce growth factors in conjunction with platelets, resulting in a healing effect. Improvement in facial texture and hair quality was found to be a significant predictor of positive clinical outcomes, and higher levels of self-esteem and a positive outlook on the aging process were strong indicators of improved quality of life. The present study offers empirical evidence that substantiates the positive patient satisfaction scores and the strong safety profile that are commonly linked with Platelet-Rich Plasma (PRP) injections. Therefore, based on our analysis, we consider Platelet-Rich Plasma (PRP) to be a viable and reliable therapeutic approach for addressing conditions such as alopecia, acne scars, and skin rejuvenation.

## References

1. Crovetti, G., Martinelli, G., Issi, M., Barone, M., Guizzardi, M., Campanati, B., ... & Carabelli, A. (2004). Platelet gel for healing cutaneous chronic wounds. *Transfusion and Apheresis Science*, 30(2), 145-151.
2. Singer, A. J., & Clark, R. A. (1999). Cutaneous wound healing. *New England journal of medicine*, 341(10), 738-746.
3. Chicharro-Alcántara, D., Rubio-Zaragoza, M., Damiá-Giménez, E., Carrillo-Poveda, J. M., Cuervo-Serrato, B., Peláez-Gorrea, P., & Sopena-Juncosa, J. J. (2018). Platelet rich plasma: new insights for cutaneous wound healing management. *Journal of functional biomaterials*, 9(1), 10.
4. Dieckmann, C., Renner, R., Milkova, L., & Simon, J. C. (2010). Regenerative medicine in dermatology: biomaterials, tissue engineering, stem cells, gene transfer and beyond. *Experimental dermatology*, 19(8), 697-706.
5. Anitua, E., Alkhraisat, M. H., & Orive, G. (2012). Perspectives and challenges in regenerative medicine using plasma rich in growth factors. *Journal of controlled release*, 157(1), 29-38.
6. Ahmad, Z., Howard, D., Brooks, R. A., Wardale, J., Henson, F., Getgood, A., & Rushton, N. (2012). The role of platelet rich plasma in musculoskeletal science. *JRSM short reports*, 3(6), 1-9.
7. Eppley, B. L., Woodell, J. E., & Higgins, J. (2004). Platelet quantification and growth factor analysis from platelet-rich plasma: implications for wound healing. *Plastic and reconstructive surgery*, 114(6), 1502-1508.
8. Zielins, E. R., Atashroo, D. A., Maan, Z. N., Duscher, D., Walmsley, G. G., Hu, M., ... & Longaker, M. T. (2014). Wound healing: an update. *Regenerative medicine*, 9(6), 817-830.
9. Gupta, S., Paliczak, A., & Delgado, D. (2021). Evidence-based indications of platelet-rich plasma therapy. *Expert review of hematology*, 14(1), 97-108.
10. Mercuri, S. R., Paolino, G., Di Nicola, M. R., & Vollono, L. (2021). Investigating the safety and efficacy of platelet-rich plasma (PRP) treatment for female androgenetic alopecia: Review of the literature. *Medicina*, 57(4), 311.
11. Saita, Y., Kobayashi, Y., Nishio, H., Wakayama, T., Fukusato, S., Uchino, S., ... & Kaneko, K. (2021). Predictors of effectiveness of platelet-rich plasma therapy for knee osteoarthritis: a retrospective cohort study. *Journal of Clinical Medicine*, 10(19), 4514.
12. Chahla, J., Cinque, M. E., Piuze, N. S., Mannava, S., Geeslin, A. G., Murray, I. R., ... & LaPrade, R. F. (2017). A call for standardization in platelet-rich plasma preparation protocols and composition reporting: a systematic review of the clinical orthopaedic literature. *JBJS*, 99(20), 1769-1779.
13. Sardari, K., Reza Emami, M., Kazemi, H., Reza Movasagi, A., Afkhami Goli, A., Lotfi, A., & Malekzadeh, S. (2011). Effects of platelet-rich plasma (PRP) on cutaneous regeneration and wound healing in dogs treated with dexamethasone. *Comparative clinical pathology*, 20, 155-162.
14. Camargo Garbin, L., Lopez, C., & Carmona, J. U. (2021). A critical overview of the use of platelet-rich plasma in equine medicine over the last decade. *Frontiers in veterinary science*, 8, 641818.
15. Suthar, M., Gupta, S., Bukhari, S., & Ponemone, V. (2017). Treatment of chronic non-healing ulcers using autologous platelet rich plasma: a case series. *Journal of biomedical science*, 24, 1-10.
16. Nanda, S., Chauhan, K., Shetty, V., Dashore, S., & Bhatia, S. (2021). Platelet-rich plasma in aesthetics. *Indian Dermatology Online Journal*, 12(Suppl 1), S41-S54.
17. Elnehrawy, N. Y., Ibrahim, Z. A., Eltoukhy, A. M., & Nagy, H. M. (2017). Assessment of the efficacy and safety of single platelet-rich plasma injection on different types and grades of facial wrinkles. *Journal of cosmetic dermatology*, 16(1), 103-111.
18. Shapiro, J., Ho, A., Sukhdeo, K., Yin, L., & Sicco, K. L. (2020). Evaluation of platelet-rich plasma as a treatment for androgenetic alopecia: a randomized controlled trial. *Journal of the American Academy of Dermatology*, 83(5), 1298-1303.

19. Dubin, D. P., Lin, M. J., Leight, H. M., Farberg, A. S., Torbeck, R. L., Burton, W. B., & Khorasani, H. (2020). The effect of platelet-rich plasma on female androgenetic alopecia: a randomized controlled trial. *Journal of the American Academy of Dermatology*, 83(5), 1294-1297.
20. Torabi, P., Behrangi, E., Goodarzi, A., & Rohaninasab, M. (2020). A systematic review of the effect of platelet-rich plasma on androgenetic alopecia of women. *Dermatologic Therapy*, 33(6), e13835.
21. Pavithra, T. R., Rajashekar, T. S., & Prasanna, H. (2023). A comparative study of topical procapil with platelet-rich plasma therapy versus topical redensyl, saw palmetto, and biotin with platelet-rich plasma therapy in the treatment of androgenetic alopecia. *Cureus*, 15(5).
22. Butt, G., Hussain, I., Ahmed, F. J., & Choudhery, M. S. (2019). Efficacy of platelet-rich plasma in androgenetic alopecia patients. *Journal of Cosmetic Dermatology*, 18(4), 996-1001.
23. Emer, J. (2019). Platelet-rich plasma (PRP): current applications in dermatology. *Skin therapy letter*, 24(5), 1-6.
24. Asif, M., Kanodia, S., & Singh, K. (2016). Combined autologous platelet-rich plasma with microneedling verses microneedling with distilled water in the treatment of atrophic acne scars: a concurrent split-face study. *Journal of cosmetic dermatology*, 15(4), 434-443.
25. El-Domyati, M., Abdel-Wahab, H., & Hossam, A. (2018). Microneedling combined with platelet-rich plasma or trichloroacetic acid peeling for management of acne scarring: a split-face clinical and histologic comparison. *Journal of cosmetic dermatology*, 17(1), 73-83.
26. Ibrahim, Z. A., El-Ashmawy, A. A., & Shora, O. A. (2017). Therapeutic effect of microneedling and autologous platelet-rich plasma in the treatment of atrophic scars: a randomized study. *Journal of cosmetic dermatology*, 16(3), 388-399.
27. Al Taweel, A. A. I., Al Refae, A. A. A. S., Hamed, A. M., & Kamal, A. M. (2019). Comparative study of the efficacy of Platelet-rich plasma combined with carboxytherapy vs its use with fractional carbon dioxide laser in atrophic acne scars. *Journal of Cosmetic Dermatology*, 18(1), 150-155.
28. Kar, B. R., & Raj, C. (2017). Fractional CO2 laser vs fractional CO2 with topical platelet-rich plasma in the treatment of acne scars: a split-face comparison trial. *Journal of Cutaneous and Aesthetic Surgery*, 10(3), 136-144.
29. Na, J. I., Choi, J. W., Choi, H. R., Jeong, J. B., Park, K. C., Youn, S. W., & Huh, C. H. (2011). Rapid healing and reduced erythema after ablative fractional carbon dioxide laser resurfacing combined with the application of autologous platelet-rich plasma. *Dermatologic Surgery*, 37(4), 463-468.
30. Zhu, J. T., Xuan, M., Zhang, Y. N., Liu, H. W., Cai, J. H., Wu, Y. H., ... & Cheng, B. (2013). The efficacy of autologous platelet-rich plasma combined with erbium fractional laser therapy for facial acne scars or acne. *Molecular Medicine Reports*, 8(1), 233-237.
31. Shin, M. K., Lee, J. H., Lee, S. J., & Kim, N. I. (2012). Platelet-rich plasma combined with fractional laser therapy for skin rejuvenation. *Dermatologic surgery*, 38(4), 623-630.
32. Kang, C., & Lu, D. (2022). Combined effect of microneedling and platelet-rich plasma for the treatment of acne scars: a meta-analysis. *Frontiers in Medicine*, 8, 788754.
33. Bolton, M. A., & Stern, T. A. (2010). The impact of body image on patient care. *The primary care companion for CNS disorders*, 12(2), 27353.
34. Hetz, S. P., Martin, J., & Pototschnig, H. (2022). Patient satisfaction and clinical effects of platelet-rich plasma on pattern hair loss in male and female patients. *Cureus*, 14(9).
35. Raeissadat, S. A., Rayegani, S. M., Babae, M., & Ghorbani, E. (2013). The effect of platelet-rich plasma on pain, function, and quality of life of patients with knee osteoarthritis. *Pain research and treatment*, 2013.
36. Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today*, 24(2), 105-112.
37. Meyers, A., Jin, A., Kwicien, G. J., Gatherwright, J., Khetarpal, S., & Zins, J. E. (2023). Platelet-rich plasma for treatment of hair loss improves patient-reported quality of life. *Aesthetic Plastic Surgery*, 47(4), 1528-1534.
38. Evans, A. G., Mwangi, J. M., Pope, R. W., Ivanic, M. G., Botros, M. A., Glassman, G. E., ... & Kassis, S. (2022). Platelet-rich plasma as a therapy for androgenic alopecia: a systematic review and meta-analysis. *Journal of Dermatological Treatment*, 33(1), 498-511.
39. Gkini, M. A., Kouskoukis, A. E., Tripsianis, G., Rigopoulos, D., & Kouskoukis, K. (2014). Study of platelet-rich plasma injections in the treatment of androgenetic alopecia through an one-year period. *Journal of cutaneous and aesthetic surgery*, 7(4), 213-219.
40. Betsi, E. E., Germain, E., Kalbermatten, D. F., Tremp, M., & Emmenegger, V. (2013). Platelet-rich plasma injection is effective and safe for the treatment of alopecia. *European journal of plastic surgery*, 36, 407-412.
41. Kwame, A., & Petrucka, P. M. (2021). A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward. *BMC nursing*, 20(1), 158.
42. Hunt, J. M. (1999). The cardiac surgical patient's expectations and experiences of nursing care in the intensive care unit. *Australian Critical Care*, 12(2), 47-53.
43. Stevens, J., & Khetarpal, S. (2019). Platelet-rich plasma for androgenetic alopecia: a review of the literature and proposed treatment protocol. *International journal of women's dermatology*, 5(1), 46-51.

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