Content available at: https://www.ipinnovative.com/open-access-journals

IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: https://www.ijced.org/

Original Research Article

Comparative study of platelet rich plasma therapy versus microneedling as a treatment modality for androgenetic alopecia

Sarthak Bansal[1], Sanjeev B Gupta[1]*, Aayush Gupta[1], Asharbh Raman[1], Jahanvi Goyal[1]

[1]Dr. D.Y. Patil Medical College, Hospital and Research Centre, Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

Abstract

Aim: To compare the therapeutic efficacy of platelet-rich plasma (PRP) therapy and microneedling in the treatment of androgenetic alopecia (AGA).
Study Design: This analytical cohort study was conducted over an 18-month period, involving 40 male participants with Hamilton-Norwood grades II–IV AGA.
Materials and Methods: Participants were divided into two groups of 20 each. Group A received microneedling sessions once every three weeks, while Group B underwent PRP therapy at the same frequency. Both groups were supplemented with 5% topical minoxidil applied twice daily. Efficacy assessments included dermoscopic evaluation of hair density, hair count, Hamilton-Norwood grading, hair pull tests, and treatment satisfaction scores over a 12-week period. Data were statistically analyzed using SPSS v26, with paired and unpaired t-tests applied to measure pre- and post-treatment outcomes.
Results: Both microneedling and PRP therapy demonstrated significant improvements in all evaluated parameters. Microneedling showed a mean increase in hair count from 155.75 ± 15.86 to 199.65 ± 20.25 ($p < 0.001$) and hair density from 168.95 ± 16.23 to 216.5 ± 23.27 ($p < 0.001$). PRP therapy showed a mean increase in hair count from 166.85 ± 17.27 to 195.35 ± 21.96 ($p < 0.001$) and hair density from 174.2 ± 20.01 to 206.85 ± 28.05 ($p < 0.001$). Hair pull test results improved significantly, with negative results rising to 95% in the microneedling group and 100% in the PRP group. Treatment satisfaction scores were high in both groups, with no statistically significant difference between them ($p = 0.863$).
Conclusion: Both microneedling and PRP are effective, minimally invasive treatments for AGA. While microneedling demonstrated slightly greater efficacy in improving hair count and density, PRP therapy showed comparable outcomes and excelled in hair retention. These therapies offer viable alternatives for managing AGA, with treatment selection tailored to individual patient preferences and clinical needs.

Keywords: Androgenetic alopecia, Platelet-rich plasma, Microneedling, Hair loss treatment, Hair density, Hair count, Hamilton-norwood grading, Patient satisfaction, Minimally invasive therapy, Scalp health

Received: 06-02-2025; **Accepted:** 05-04-2025; **Available Online**: 26-05-2025

1. Introduction

Androgenetic alopecia (AGA), the most common cause of hair loss worldwide, is characterized by gradual and progressive patterned scalp hair loss.[1] The precise age threshold defining early-onset AGA varies across literature, with cutoffs commonly noted at 30 or 35 years.[1,2] AGA affects approximately 0.2–2% of the global population, with the prevalence varying across genders and races.[3] Typically, AGA manifests in genetically susceptible men and women in specific patterns: male pattern and female pattern hair loss (MPHL and FPHL).[4] MPHL is characterized by frontoparietal and frontal hairline recession, followed by vertex thinning and progression until the scalp becomes completely bald.[5] The etiology of AGA is multifactorial, involving genetic predisposition, androgen activity, chronic micro-inflammation, and oxidative stress.[6] Dihydrotestosterone (DHT) plays a pivotal role by binding to androgen receptors leading to follicular miniaturization, shortened anagen phases, and elongated telogen phases. Over time, this process replaces terminal hairs with fine, vellus-like hairs, resulting in visible scalp thinning and baldness.[7]

Apart from first-line treatment options with topical minoxidil and oral finasteride, adjuvant procedural therapies with platelet-rich plasma (PRP) and microneedling have emerged as minimally invasive and effective options for the treatment of AGA. These therapies aim to harness the body's

*Corresponding author: Sanjeev B Gupta
Email: sarthak2698@gmail.com

http://doi.org/: 10.18231/j.ijced.2025.032

natural regenerative mechanisms to stimulate hair regrowth and improve scalp health. Their popularity has surged due to favorable safety profiles, minimal downtime, and growing evidence of efficacy.[8] PRP therapy involves using autologous plasma enriched with platelets, rich in growth factors such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), and transforming growth factor-beta (TGF-β).[9,10] These factors are believed to promote angiogenesis, increase vascular supply to hair follicles, stimulate dermal papilla cells, and prolong the anagen phase of hair growth.[11] Microneedling, also known as collagen induction therapy, creates controlled micro-injuries in the scalp using fine needles.[12,13] This process triggers the body's wound-healing response, releasing growth factors and cytokines that stimulate hair regrowth.[14] Microneedling also enhances the absorption of topical agents, such as minoxidil and improves the microenvironment of hair follicles.[15]

While both PRP therapy and microneedling have shown significant potential as treatments for AGA, limited comparative data exists to determine their relative efficacy, safety, and patient satisfaction. Most studies focus on one modality in isolation, leaving clinicians and patients with little guidance on selecting between these therapies. Understanding their comparative advantages and limitations is crucial for optimizing treatment strategies and tailoring interventions to individual patient needs. The present study aims to fill the knowledge gap by directly comparing the clinical efficacy of PRP therapy and microneedling in managing AGA. By evaluating key parameters such as hair density, and improvement in the Norwood Hamilton grading, the study seeks to provide evidence-based insights into the relative benefits of these two modalities. Furthermore, the findings of this study will help establish standardized protocols and inform clinical decision-making, ultimately enhancing the quality of care for patients with AGA.

2. Materials and Methods

The research was conducted at the Department of Dermatology in a tertiary care hospital of western India, after obtaining approval from the institutional ethics committee. This was an observational study, following a cohort analytical design. The study spanned from October 2022 to March 2024. Using a convenience sampling method and based on historical records of 30 androgenetic alopecia (AGA) cases per year, a sample size of 40 patients was selected for an 18-month period. 40 male patients aged 18-45 years with a clinical diagnosis of AGA, willing to participate were included in the study. The exclusion criteria included patients with active scalp infections or patients who had undergone any AGA treatment in the preceding three months. Written informed consent was obtained from all participants after explaining the study's purpose and ensuring data confidentiality. Details of socio-demographic and clinical information were gathered using a predesigned and validated proforma. Patients with Hamilton-Norwood grades 2-4 were randomly divided into two groups and assigned to the two treatment arms. First arm received PRP therapy whereas the second arm received microneedling treatment, once every 3 weeks. Both treatment arms were followed up for 12 weeks.

2.1. PRP preparation

Blood was drawn into vacutainers containing sodium citrate. The sample was centrifuged at 1350 rpm for 10 minutes to separate plasma, which was further centrifuged at 2700 rpm for 10 minutes. The resulting PRP was injected into the scalp at a 45-degree angle into the deep dermis and subcutaneous layer, covering 1 cm^2 per 0.1 ml injection.

2.2. Microneedling

A dermaroller with 192 titanium-coated needles (1.5 mm size) was used on the scalp. After cleaning with Betadine and saline, the dermaroller was applied in longitudinal, vertical, and diagonal directions until mild erythema was achieved.

2.3. Dermoscopy and hair pull test

Baseline and follow-up photographs were taken, and hair pull tests were performed at baseline and after three months. Dermoscopic evaluations were conducted using a polarized mode at 10× magnification to assess improvement in hair density.

Treatment satisfaction was assessed on a scale of 1-10 and further stratified using a Likert scale into no satisfaction (1-3), moderate satisfaction (4-6), and high satisfaction (7-10).

2.4. Statistical analysis

Data were collected using a predesigned form, entered into Microsoft Excel, and analyzed using SPSS version 26. Statistical significance was assessed using tests such as the chi-square test and logistic regression for quantitative data. Qualitative data were analyzed using thematic analysis.

3. Results

The study evaluated socio-demographic details of AGA patients and compared the efficacy of microneedling and PRP interventions in improving various hair-related parameters among participants. Key outcome measures included improvement in Hamilton-Norwood grading, hair density and hair pull test results. Overall, the results demonstrated that both interventions were effective, with certain advantages observed in the microneedling group. The following tables and graphs summarize the detailed findings. In the microneedling group (n=20), the majority, 40% (n=8), were aged >35 years. In the PRP group (n=20) 45% (n=9) were in the 21-25 age group. This indicates that the microneedling group had a higher proportion of participants aged >35 years, while the PRP group had a larger proportion in the 21-25 age group. In both the microneedling group (n=20) and the PRP group (n=20), 75% (n=15) of participants

had a BMI within the normal range (18.5-24.9). This indicates that the BMI distribution was identical between the two groups, with the majority of participants falling within the normal BMI range. In the microneedling group (n=20), 10% (n=2) were doctors in the PRP group (n=20), 40% (n=8) were students highlights a higher proportion of students in the PRP group, while the microneedling group uniquely included participants working as doctors.

Table 1 shows the distribution of Hamilton-Norwood grading improvement between the microneedling and PRP groups (n = 20 in each group). In the microneedling group, 18 participants (90%) demonstrated an improvement of 1 grade (**Figure 2**), compared to 17 participants (85%) in the PRP group (**Figure 5**). Conversely, 2 participants (10%) in the microneedling group and 3 participants (15%) in the PRP group did not show any improvement. The difference in improvement rates between the two groups was not statistically significant (p = 0.632).

Table 2 highlights the improvement in hair density observed between the microneedling and PRP groups (n=20 each). In the ≤20 density improvement category, 10% (n=2) of participants in the microneedling group and 15% (n=3) in the PRP group were recorded. The 21–40 improvement range included 15% (n=3) of the microneedling group compared to 50% (n=11) in the PRP group, indicating a higher proportion of modest improvement in the PRP group. Conversely, the 41–60 improvement category accounted for 65% (n=13) of participants in the microneedling group (**Figure 1**) and 25% (n=6) in the PRP group, suggesting greater improvements in this range for the microneedling group (**Figure 4**). For >60 density improvement, 10% (n=2) of participants were observed in the microneedling group, while no participants in the PRP group achieved this level of improvement. The P-value of 0.024 indicates a statistically significant difference in the distribution of density improvement between the two groups, with microneedling demonstrating a trend toward greater improvements in the higher-density categories.

Table 3 compares the hair pull test results between baseline and follow-up for the microneedling and PRP groups. In the microneedling group, 65% (n=13) of participants had a positive hair pull test at baseline, which decreased significantly to 5% (n=1) at follow-up, while negative tests increased from 35% (n=7) to 95% (n=19). Similarly, in the PRP group, 45% (n=9) of participants had a positive test at baseline, which dropped to 0% (n=0) at follow-up, and negative tests increased from 55% (n=11) to 100% (n=20). The p-value for both groups was <0.001, indicating a statistically significant improvement in hair pull test results after treatment for both microneedling and PRP interventions.

Table 4 illustrates the changes in Hamilton-Norwood grading, hair count, and hair density between baseline and follow-up for participants undergoing microneedling and PRP interventions. Significant improvements were observed across all parameters in both groups, as evidenced by P-values <0.001.For Hamilton-Norwood grading, the microneedling group showed a reduction from a mean baseline score of 3 ± 0.795 to 2.1 ± 0.788 (T = 13.07, P < 0.001), while the PRP group improved from 2.75 ± 0.85 to 1.9 ± 0.85 (T = 10.37, P < 0.001), reflecting better clinical outcomes post-treatment in both groups.In terms of hair count, the microneedling group exhibited an increase from a baseline mean of 155.75 ± 15.86 to 199.65 ± 20.25 (T = -6.14, P < 0.001). Similarly, the PRP group showed an improvement from 166.85 ± 17.27 at baseline to 195.35 ± 21.96 post-treatment (T = -5.10, P < 0.001), indicating a substantial gain in hair count in both groups.For hair density, the microneedling group increased from a baseline mean of 168.95 ± 16.23 to 216.5 ± 23.27 (T = -6.12, P < 0.001),(**Figure 3**) while the PRP group improved from 174.2 ± 20.01 at baseline to 206.85 ± 28.05 at follow-up (T = -5.10, P < 0.001).(**Figure 6**) Both interventions demonstrated significant enhancements in hair density post-treatment.In the microneedling group (n=20), 40% (n=8) as 8, In the PRP group (n=20), 40% (n=8) as 8. The p-value was 0.863, indicating no statistically significant difference in treatment satisfaction scores between the two groups.

These results indicate that both microneedling and PRP are effective interventions for improving hair parameters, with statistically significant improvements in Hamilton-Norwood grading, hair count, and density from baseline to follow-up. However, microneedling showed a slightly greater increase in hair count and density compared to PRP.

Figure 1: Trichoscale image showing pre and post treatment results for the patient treated with microneedling

Figure 2: Clinical image pre and post treatment with Microneedling

Figure 3: Dermoscopic image pre and post treatment with Microneedling

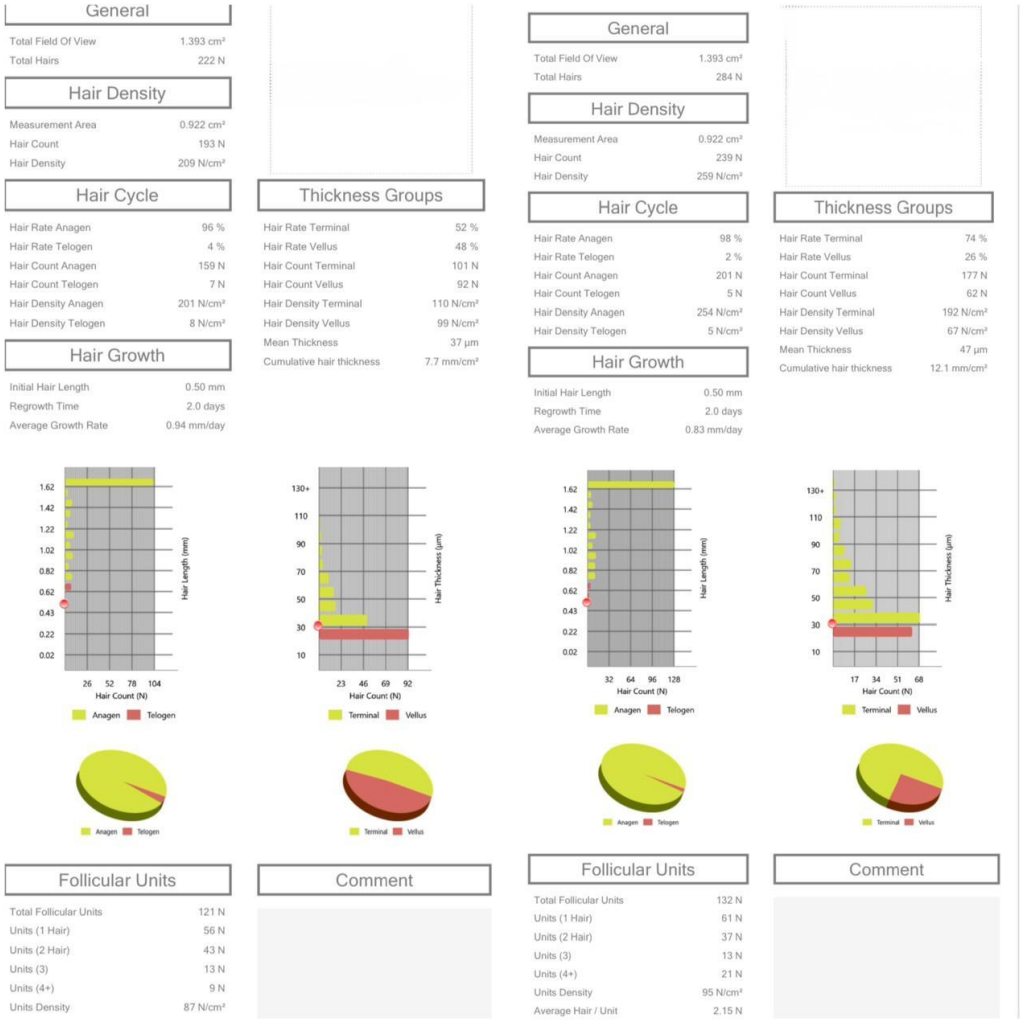

Figure 4: Trichoscale image showing pre and post treatment results for the patient treated with PRP

Figure 5: Clinical image pre and post treatment with PRP

Figure 6: Dermoscopic image pre and post treatment with PRP

Table 1: Distribution of hamilton- norwood grading improvement between microneedling and PRP.

Hamilton- Norwood Grading (Improvement)	Microneedling		PRP		P-Value
	No. of Cases	Percentage	No. of Cases	Percentage	
Improved (1 Grade)	18	90%	17	85%	0.632
Not Improved	2	10%	3	15%	
Total	20	100%	20	100%	

Table 2: Distribution of density improvement between microneedling and PRP.

Density Improvement	Microneedling		PRP		P-Value
	No. of Cases	Percentage	No. of Cases	Percentage	
≤20	2	10%	3	15%	0.024
21-40	3	15%	11	50%	
41-60	13	65%	6	25%	
>60	2	10%	0	10%	
Total	20	100%	20	100%	

Table 3: Comparison of hair pull test results between baseline and follow-up for microneedling and prp groups.

	Hair Pull Test	Baseline	Follow-up	P-Value
Micro	Positive	13	1	<0.001
	Negative	7	19	
PRP	Positive	9	0	<0.001
	Negative	7	20	

Table 4: Comparison of hamilton-norwood grading, hair count, and hair density between baseline and follow-up for microneedling and PRP interventions.

Parameter	Intervention		Mean	SD	SE	T. statistic	P-value
Hamilton-Norwood Grading	Microneedling	Baseline	3	0.795	0.177	13.07	<0.001
		Follow-up	2.1	0.788	0.176		
	PRP	Baseline	2.75	0.85	0.19	10.37	<0.001
		Follow-up	1.9	0.85	0.19		
Hair Count	Microneedling	Baseline	155.75	15.86	3.54	-6.14	<0.001
		Post-Treatment	199.65	20.25	4.52		
	PRP	Baseline	166.85	17.27	3.6	-5.1	<0.001
		Post-Treatment	195.35	21.96	4.94		
Density of Hair	Microneedling	Baseline	168.95	16.23	3.62	-6.12	<0.001
		Follow-up	216.5	23.27	5.2		
	PRP	Baseline	174.2	20.01	4.47	-5.10	<0.001
		Follow-up	206.85	28.05	6.27		

4. Discussion

This study provides a comparative analysis of microneedling and platelet-rich plasma (PRP) therapy as treatments for androgenetic alopecia, focusing on demographic, physiological, and clinical outcomes. In the present study, the age distribution within the PRP group revealed a greater proportion of younger participants aged 21–25 years (45%) compared to the microneedling group (15%). This finding aligns with the hypothesis that younger individuals may prefer PRP due to its minimally invasive nature, shorter recovery period, and its appeal as a modern, innovative treatment option. This trend is consistent with previous studies, such as those by Gentile et al. (2015)[16] and Khatu et al. (2014),[17] which also highlighted PRP's efficacy in promoting hair growth, particularly among younger participants within their respective study cohorts. At baseline, the distribution of Hamilton-Norwood grading showed no significant difference between groups (p=0.41), ensuring comparable severity of androgenetic alopecia. Post-treatment results demonstrated significant improvements in grading for both groups, with no statistically significant difference at follow-up (p=0.59). However, microneedling showed a slightly higher proportion of participants achieving a reduction to Grade 1 (25%) compared to PRP (40%). Gkini et al. (2014)[18] conducted a prospective cohort study involving 22 participants, of which 20 completed the study. They observed that milder forms of AGA (Norwood-Hamilton Grades II–III) responded more favorably to PRP treatment compared to more advanced cases (Grades IV–V). Their study reported significant improvements in hair density, diameter, and overall scalp coverage in patients with earlier-stage AGA. Gkini et al.[18] proposed that the presence of vellus hairs and partially miniaturized follicles in lower-grade AGA

might allow better penetration and action of PRP, as these follicles retain the ability to respond to growth factors and signaling pathways stimulated by PRP. The findings align with the present study, which also observed significant improvements in Hamilton-Norwood grading post-treatment, particularly in participants with less advanced stages of AGA. The slightly higher proportion of participants in the microneedling group achieving a reduction to Grade 1 supports the idea that microneedling may be particularly effective in early AGA, where its regenerative mechanisms can capitalize on the remaining active hair follicles. These comparisons underscore the critical role of AGA staging in guiding treatment selection and optimizing outcomes. The superior response observed in lower-grade AGA highlights the need for timely intervention with treatments like microneedling and PRP to maximize their efficacy before follicular degeneration becomes permanent. Hair density improvements were significant in both groups, with the microneedling group showing a mean increase from 168.95 ± 16.23 to 216.5 ± 23.27 ($p<0.001$) and the PRP group improving from 174.2 ± 20.01 to 206.85 ± 28.05 ($p<0.001$). While both treatments were effective, microneedling showed a slightly greater increase in density improvement categories, emphasizing its potential for better outcomes. In Khatu et al. (2014),[17] PRP treatment led to noticeable improvements in hair density, with an average increase in follicular units and better hair coverage. While their study did not directly compare PRP with microneedling, the reported improvements in hair volume and follicular density align with the PRP group's findings in the present study, which showed a mean increase from 174.2 ± 20.01 to 206.85 ± 28.05. However, the slightly superior outcomes observed with microneedling in the current study highlight its potential as a more effective modality for enhancing hair density. Baseline hair pull test results showed no significant difference between groups ($p=0.203$), with 65% of microneedling participants and 45% of PRP participants testing positive. Follow-up results revealed significant improvements in both groups, with negative test results increasing to 95% in the microneedling group and 100% in the PRP group ($p<0.001$). These findings confirm the effectiveness of both treatments in reducing hair loss. In the present study, the observation that PRP achieved 100% negative hair pull test results compared to 95% in the microneedling group suggests a marginally superior effect of PRP in this specific outcome measure. However, the slightly higher efficacy of microneedling in other areas, such as hair density and count improvements, indicates that both modalities have unique strengths and may cater to different therapeutic goals. Overall, the findings of Khatu et al. (2014)[17] and Gkini et al. (2014)[18] complement the results of the present study by confirming the effectiveness of PRP in reducing hair shedding and achieving negative hair pull test results. Treatment satisfaction scores did not differ significantly between groups ($p=0.863$). Both groups reported similar levels of high satisfaction, with 40% of participants in each group rating their satisfaction as 8/10. This indicates comparable acceptability and perceived efficacy of the treatments. Gkini et al. (2014)[18] and Khatu et al. (2014)[17] similarly highlighted positive patient satisfaction outcomes. These comparisons emphasize the reliability of PRP as a treatment for active hair loss while also highlighting the potential of microneedling as a similarly effective and versatile alternative.

5. Conclusion

This study comprehensively evaluated the comparative efficacy of microneedling and platelet-rich plasma (PRP) therapy in the management of androgenetic alopecia (AGA). Both treatment modalities demonstrated significant improvements across key clinical parameters, including Hamilton-Norwood grading, hair count, and hair density. Additionally, both therapies were well-tolerated, with minimal adverse effects, reinforcing their safety and acceptability. Microneedling was associated with slightly superior outcomes in hair count and density improvements, as well as achieving higher density improvement categories compared to PRP. These findings suggest that microneedling may offer a greater capacity for stimulating follicular activity and promoting hair regrowth, particularly in cases of early-stage AGA where the follicles remain responsive to regenerative interventions. The controlled micro-injuries caused by microneedling may enhance the local scalp environment, activate bulge stem cells, and optimize the penetration of topical agents such as minoxidil, further amplifying therapeutic effects. Conversely, PRP therapy demonstrated comparable efficacy, with marginally better results in reducing hair shedding, as evidenced by the higher proportion of participants achieving negative hair pull test results. PRP's ability to deliver concentrated growth factors to the scalp supports its role in prolonging the anagen phase, improving hair quality, and reducing active hair loss. High patient satisfaction scores observed in the PRP group further underscore its acceptability as a minimally invasive treatment option. While both therapies present viable options for managing AGA, the choice of treatment should be tailored to individual patient profiles, considering factors such as AGA severity, age, preferences, and desired outcomes. Future research involving larger sample sizes and longer follow-up periods is recommended to validate these findings and explore potential synergies of combining microneedling and PRP for enhanced therapeutic outcomes. In conclusion, microneedling and PRP therapy are effective, safe, and well-tolerated treatments for AGA. Both modalities offer unique advantages, providing clinicians with versatile tools to address the clinical and psychological challenges posed by this common condition.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Lolli F, Pallotti F, Rossi A, Fortuna MC, Caro G, Lenzi A, et al. Androgenetic alopecia: A review. *Endocrine*. 2017;57(1):9–17.
2. Sanke S, Chander R, Jain A, Garg T, Yadav P. A comparison of the hormonal profile of early androgenetic alopecia in men with the phenotypic equivalent of polycystic ovarian syndrome in women. *JAMA Dermatol*. 2016;152(9):986–91.
3. He F, Shen M, Zhao Z, Liu Y, Zhang S, Tang Y, et al. Epidemiology and disease burden of androgenetic alopecia in college freshmen in China: A population-based study. *PLoS One*. 2022;17(2):e0263912.
4. Redler S, Messenger AG, Betz RC. Genetics and other factors in the aetiology of female pattern hair loss. *Exp Dermatol*. 2017;26(6):510–7.
5. Tai T, Kochhar A. Physiology and medical treatments for alopecia. *Facial Plast Surg Clin North Am*. 2020;28(2):149–59.
6. Oiwoh SO, Enitan AO, Adegbosin OT, Akinboro AO, Onayemi EO. Androgenetic Alopecia: A Review. *Niger Postgrad Med J*. 2024;31(2):85–92.
7. Anastassakis K. Diet, Lifestyle, and AGA/FPHL. InAndrogenetic Alopecia From A to Z: Vol. 2 Drugs, Herbs, Nutrition and Supplements. Cham: Springer International Publishing. 2022:255–67.
8. Pozo-Pérez L, Tornero-Esteban P, López-Bran E. Clinical and preclinical approach in AGA treatment: a review of current and new therapies in the regenerative field. *Stem Cell Res Ther*. 2024;15(1):260.
9. Emer J. Platelet-rich plasma (PRP): current applications in dermatology. *Skin Therapy Lett*. 2019;24(5):1–6.
10. Leo MS, Kumar AS, Kirit R, Konathan R, Sivamani RK. Systematic review of the use of platelet-rich plasma in aesthetic dermatology. *J Cosmet Dermatol*. 2015;14(4):315–23.
11. Singhal P, Agarwal S, Dhot P, Sayal SK. Efficacy of platelet-rich plasma in treatment of androgenic alopecia. *Asian J Transfus Sci*. 2015;9(2):159–62.
12. Gowda BJ, Ahmed MG, Sanjana A. Can microneedles replace hypodermic needles? Painless drug delivery. *Resonance*. 2022;27(1):63–85.
13. Jaiswal S, Jawade S. Microneedling in Dermatology: A Comprehensive Review of Applications, Techniques, and Outcomes. *Cureus*. 2024;16(9):e70033.
14. Gentile P, Dionisi L, Pizzicannella J, de Angelis B, de Fazio D, Garcovich S. A randomized blinded retrospective study: the combined use of micro-needling technique, low-level laser therapy and autologous non-activated platelet-rich plasma improves hair re-growth in patients with androgenic alopecia. *Expert Opin Biol Ther*. 2020;20(9):1099–109.
15. Jia L, Xiong J, Guo R, Li Y, Jiang H. A comprehensive review of microneedling as a potential treatment option for androgenetic alopecia. *Aesthetic Plast Surg*. 2022;46(6):2979–94.
16. Gentile P, Garcovich S, Bielli A, Scioli MG, Orlandi A, Cervelli V. The effect of plateletrich plasma in hair regrowth: a randomized placebo-controlled trial. *Stem Cells Transl Med*. 2015;4(11):1317–23.
17. Khatu SS, More YE, Gokhale NR, Chavhan DC, Bendsure N. Platelet-rich plasma in androgenic alopecia: myth or an effective tool. *J Cutan Aesthet Surg*. 2014;7(2):107–10.
18. Gkini MA, Kouskoukis AE, Tripsianis G, Rigopoulos D, Kouskoukis K. Study of platelet-rich plasma injections in the treatment of androgenetic alopecia through a one-year period. *J Cutan Aesthet Surg*. 2014;7:213–9.

Cite this article: Bansal S, Gupta SB, Gupta A, Raman A, Goyal J. Comparative study of platelet rich plasma therapy versus microneedling as a treatment modality for androgenetic alopecia. *IP Indian J Clin Exp Dermatol*. 2025;11(2):194-201.