

Platelet-Rich Plasma: The Journey so Far !

Abstract

Platelet-rich plasma (PRP) is an autologous blood product, obtained after blood centrifugation. PRP is rich in growth factors which promote tissue-healing, alter angiogenesis, and possess versatile immunomodulatory effects, in the relative absence of any significant demonstrable adverse effects. Consequently, PRP has found application in multiple specialities in recent years, including dermatology. A literature search was performed on PubMed, Medline database, and Google Scholar, using keywords like platelet-rich plasma (PRP), platelet-concentrated plasma, platelet-rich growth factors, autologous platelet concentrate. Relevant studies were selected, and data was analyzed following extraction. Studies show that PRP has not only been used as an adjunctive modality but has been employed as a stand-alone therapy as well. Multiple authors have reported PRP to be efficacious in disparate dermatological conditions, like alopecia, skin rejuvenation, healing of refractory cutaneous ulcers, and even acne scar management. The strongest evidence so far has been demonstrated in androgenetic alopecia and facial skin rejuvenation. However, routine use in dermatological conditions is hampered by the relative paucity of high-quality evidence and large randomized studies. Furthermore, PRP composition and preparation methods are not yet standardized and even the treatment regimens proposed too vary widely. The present review provides a bird's eye view of the evidence available so far regarding the use of PRP in dermatology. The review focusses more on recent prospective studies, including randomized trials and tries to summarize the evidence in a brief, but comprehensive manner.

Keywords: *Dermatology, platelet-rich plasma, platelet-rich plasma, treatment*

Introduction

Platelet-rich plasma (PRP) (also called platelet-concentrated plasma or platelet-rich growth factors), is an autologous blood product having a large concentration of platelets suspended in a small volume of plasma, above the baseline.^[1] The initial description and clinical application of PRP were in cardiac surgery and hematology^[2] but owing to its versatile anti-inflammatory and immunomodulatory actions, PRP found wide interest in a variety of clinical fields, including dentistry and ophthalmology. Use of PRP is of interest particularly among orthopedicians and sports medicine experts due to its regenerative and tissue healing effects.^[3] Moreover, PRP has found use in dermatology, in conditions such as alopecia, wound healing, and skin rejuvenation. Rather than delving into history, this review tries to compile key uses of PRP in dermatology; focussing on evidence and reports published so far that remain in a nutshell.

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Methods

A thorough literature search was performed on PubMed, Medline database, and Google Scholar, with the following keywords: platelet-rich plasma (PRP), platelet-concentrated plasma, platelet-rich growth factors, and autologous platelet concentrate. The decision to include articles in this review was mutually decided by both authors, with preference given to studies with robust data and higher levels of evidence. Data were extracted and information so obtained was analyzed and organized coherently in the narrative flow. Wherever relevant, data and past studies were summarized in the form of tables.

Composition of PRP

PRP is an autologous blood product containing a rich concentration of not only platelets, but a variety of growth factors, cytokines, chemokines, and proteins.^[4] The key growth factors present in PRP are summarized in Table 1. This unique power-packed composition of

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Akanksha Kaushik, Muthu Sendhil Kumaran

*Department of Dermatology,
Venereology and Leprology,
Postgraduate Institute of
Medical Education and
Research, Chandigarh, India*

Address for correspondence:
Dr. Muthu Sendhil Kumaran,
Department of Dermatology,
Venereology and Leprology,
Postgraduate Institute of
Medical Education and
Research, Chandigarh, India.
E-mail: drsen_2000@yahoo.com

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Table 1: Growth factors present in PRP and major physiological actions^[5,6]

PDGF- $\alpha\alpha$, $\alpha\beta$ and $\beta\beta$: Chemotactic, mitogenic
VEGF: Chemotactic, mitogenic, pro-angiogenesis
EGF: Mitogenic, pro-angiogenesis
FGF: Tissue regeneration
HGF: Tissue regeneration
TGF- β 1 and β 2: Chemotactic, mitogenic, regulate matrix protein composition, regulate cellular activity

growth factors not only produces tissue repair, regeneration, and alters angiogenesis but also plays a vital role in connective tissue remodelling and cell-cycle regulation.

PRP in Dermatology

Androgenetic alopecia

Androgenetic alopecia (AGA) is a common and psychologically distressing disorder affecting both males and females worldwide. Although a variety of management strategies prevail, including minoxidil, finasteride, and hair transplantation, a significant number of patients either remain outside the ambit of these strategies or may not fully respond to treatment. In the last decade, with the advent of PRP, it has been an active area of interest for AGA management. The role of PRP in the management of other alopecias is elusive.

Mechanism

The growth factors and immunomodulatory action of PRP may stimulate stem cell proliferation and differentiation in the follicle bulge. The possible mechanisms how PRP acts in AGA may include any/all the following:^[1,5]

- Upregulating growth factors such as insulin-like growth factor-1 (IGF-1), fibroblast growth factor -7 (FGF-7), and vascular endothelial growth factor (VEGF) in dermal papilla → Lengthen the anagen phase
- The Wnt/ β -catenin signal pathway gets activated → Promotes the development of the follicles
- Activation of the ERK/Akt signal pathway → Apoptosis is downregulated
- Increased VEGF and PDGF promoting angiogenesis in the follicular area
- Raised BCL-2 levels → Apoptosis is downregulated.

Administration of PRP

PRP may be administered by multiple modes. The possible modes may be:

- Interfollicular PRP injection: Retrogradely from deeper to superficial planes, in a dose of 0.05 to 0.1 mL/cm²
- Mesotherapy: Microneedle roller is used for scalp punctures using fine 1 mm needles, followed by interfollicular PRP injections
- Finally, PRP is sprayed topically on the scalp and left overnight.

PRP can also be used as adjunctive therapy in hair transplantation, by dipping the follicular grafts in PRP prior to transplant.^[7] PRP has also been evaluated in follicular unit extraction hair transplant (FUE) in AGA patients. In a prospective randomized study in 40 FUE hair transplant patients, intraoperative PRP was reported to give faster density, reduction in catagen loss of transplanted hair, and activation of dormant hair follicles with faster skin recovery. In the PRP group, all patients showed >75% hair regrowth at 6 months, while in the non-PRP group, only 4 patients had >75% hair regrowth at the same time. Similarly, >75% graft density was noticed in 12 patients at 4 weeks in the PRP group while no patient showed the same in the non-PRP group.^[8] More studies are needed before it becomes standard of care in these procedures. Takikawa *et al.*^[9] suggested the use of dalteparin and protamine microparticles (D/P MPs) with PRP in AGA to produce better hair growth. The authors performed a comparative study in 26 patients with AGA, with 13 patients receiving 3 mL of PRP and D/P MPs, and 13 patients receiving PRP with saline for AGA. Significant differences were seen in hair cross-section with microscopy showing thickened epithelium, increased vessels around follicles, and proliferation of fibroblasts and collagen fibrils; but not in hair numbers in PRP, and PRP and D/P MP injections.

Evidence for use

The evidence for PRP use in AGA, as shown in multiple studies, is summarized in Table 2. In a study evaluating the role of CD34+ containing autologous interfollicular PRP injections on 26 patients with hair loss pattern, 13 patients received CD34+ cell containing PRP and 13 patients received interfollicular placental extract injections. The authors reported significant improvement in hair thickness but not in hair count.^[10] Rodrigues *et al.*^[11] reported significant improvement in hair count, hair density, and percentage of anagen hairs in AGA patients receiving subcutaneous PRP injections. However, the authors noted the lack of association between clinical improvement and levels of growth factors like PDGF, EGF, VEGF, and platelet count, thereby implying that mechanisms other than growth factors may probably be involved in the benefit. Another study reported a significant improvement in hair density, global assessment scores, and terminal to vellus hair ratios with two sessions of monthly PRP injections in 30 AGA patients (20 males and 10 females).^[12] Similar beneficial effects were shown in a randomized trial by Alves and Grimalt^[13] in 20 AGA patients.

In a prospective study on 20 AGA patients, 3-weekly PRP injections given for 3 months showed significant improvement in hair count, hair diversity, increased number of thick terminal hairs, yellow dot reduction, and improved perifollicular pigmentation on dermoscopy.^[14] Significantly better hair growth was reported in patients receiving PRP with microneedling, compared with PRP with 5% minoxidil as well as 5% minoxidil monotherapy.^[15] Another

Table 2: Evidence for the use of PRP in AGA

Authors	Study design	Sample size	PRP preparation used	Follow-up	Results
Kang, <i>et al.</i> ^[10] 2011	Prospective open-label, controlled study comparing effect of interfollicular injections of CD34+ cell containing PRP vs placental extract	n=26 (13 treated, 13 controls)	Automated PRP Device (SmartPREP) Conc. 5.9x	6 months	PRP showed significantly better improvement in hair thickness ($P=0.027$) and two-point score ($P=0.023$) than placental extract, but not in hair count ($P>0.05$)
Alves and Grimalt, ^[13] 2016	Randomized placebo-controlled, double-blind, half-head study to assess the efficacy of PRP on the treatment of AGA	n=25	Leukocyte- poor activated (CC) 3×OWB PRP used	6 months	Significant improvement with PRP regarding mean anagen hairs, telogen hairs, hair density, and terminal hair density ($P<0.05$). PRP also found to increase hair density when compared with the control side ($P<0.05$)
Rodrigues <i>et al.</i> , 2018	Randomised, double-blind trial evaluating platelet count and growth factor levels in injected PRP using TrichoScan in AGA	n=30 (All males)	Manual PRP centrifugation, concentration of 1200 x 10 ⁶ platelets/μL	5 months	Significant improvement in hair count ($P=0.0016$), hair density ($P=0.012$) and percentage of anagen hairs ($P=0.007$) in AGA patients receiving subcutaneous PRP injections. Lack of association between clinical improvement and levels of growth factors.
Butt <i>et al.</i> , ^[12] 2018	Prospective study to evaluate the efficacy of two sessions of monthly PRP injections in AGA	n=30 (20 males, 10 females)	Manual centrifugation was done for PRP, at 1000 rpm for 10 min	6 months	Significant improvement in hair density ($P<0.05$), global assessment scores ($P<0.05$). Terminal to vellus hair ratios increased in 60% of patients
Shetty and Goel, ^[14] 2018	A prospective comparative study using dermoscopy for pre- and post-treatment evaluation in patients with AGA treated with PRP	n=20 (All male patients)	Manual centrifugation, 1500 rpm for 6 min	3 months	Significant improvement in hair count (27.4%), hair diversity (84.2%), reduction in yellow dots (60%) and perifollicular pigmentation (92.3%). Hair pull test negative in 10 patients (50%).
Jha <i>et al.</i> , ^[15] 2018	A prospective study using clinical photography and dermoscopy in AGA patients treated with minoxidil 5% vs. patients treated with minoxidil 5% plus PRP vs, treatment with minoxidil 5%, PRP, and microneedling.	n=93	Double manual spin method for PRP. Platelet concentration not mentioned	4 months	Patient groups having PRP as part of treatment regimen reported significantly better results in hair pull test, terminal-to-vellus hair ratio, and patient satisfaction score ($P<0.05$)
Verma <i>et al.</i> , ^[16] 2019	Prospective study to compare PRP injections with minoxidil therapy in AGA patients.	n=30 (All males)	A manual double-spin technique used to prepare PRP. Final PRP prepared to have a mean platelet conc of 12.4±1.7 lakh/mm ³	6 months	Patients receiving PRP injections showed better outcome than minoxidil group in terms of hair pull test, hair growth questionnaire, global photography and patient satisfaction score.

*PRP=Platelet-rich plasma, AGA=Androgenetic alopecia

prospective study was done in 30 male AGA patients, where patients receiving monthly interfollicular PRP injections ($n = 16$) were compared with patients receiving a topical application of 5% minoxidil twice daily for 4 months ($n = 14$).^[16] The authors reported a better outcome in the PRP injection group than minoxidil group in terms of hair pull test, hair growth questionnaire, global photography, and patient satisfaction score. Side effects with PRP were minimal and were well-tolerated.

A systematic review and meta-analysis including 23 studies of PRP use in AGA (7 randomized controlled trials, with 6 studies having a half-head design) reported that monthly PRP administration for 3 months produced significant improvement in total hair density, compared to placebo,

with most studies using a half-head design.^[17] The authors further reported that while 26% of studies showed strong evidence for the use of PRP in AGA, 30% of studies showed moderate-level evidence and as high as 47% of studies had low evidence. Whereas another systematic review concluded the lack of enough evidence for the use of PRP-based therapies in androgenetic alopecia.^[18] The review suggested that most studies regarding PRP use in AGA were small prospective studies with less than 30 subjects or were a meta-analysis of small studies. Furthermore, no standardization of PRP composition, preparation methods, and dosing were seen.

We found that most studies on PRP use in AGA used monthly injections, with treatment periods ranging from

2 to 4 months in most studies. Monthly PRP injections for 3–4 months seems to be a well-tolerated and efficacious management strategy for AGA. However, the strength of evidence available is overall moderate-to-low owing to lack of adequate large randomized studies and inconsistency in PRP composition and preparation methods, dosing schedule, and methodology of applications used in the various studies. Until more studies with strong evidence are available, PRP use in AGA remains more of adjunct therapy, although with promise for future routine use.

Skin rejuvenation

The role of PRP in aesthetic medicine and skin rejuvenation has been an area of interest in the past few years. Possible improvement in skin elasticity and cosmetic appearance has been proposed to be due to a variety of mechanisms, including the increased proliferation of dermal fibroblasts; increased expression of matrix metalloproteinases (like MMP-1 and 3) which degrade and remove photodamaged extracellular matrix; increased collagen type 1 production, and modifying cell-cycle regulators.^[5] Cho *et al.*^[19] have reported these PRP-induced remodelling effects in a recent study. As per authors, PRP induces increased expression of extracellular matrix products like type I collagen, elastin, MMP1, and MMP2, thus promoting wound healing. PRP treated human dermal fibroblasts (HDFs) also demonstrate a dramatic reduction in phosphorylation of c-Jun N-terminal kinase (JNK), which further promotes wound healing.

Evidence for use

Select studies evaluating the role of PRP in facial rejuvenation are summarized in Table 3.

A recent randomized, split-face trial by Alam *et al.*,^[20] reported significant improvement in coarse as well as the fine texture of skin by intradermal PRP, as assessed by masked participants themselves. Similar benefits were reported in a prospective study comprising 11 females.^[21] However, another prospective study in 10 females reported significant improvement only in infraorbital colour homogeneity and not in melanin content, stratum corneum hydration, wrinkle volume, or visibility index.^[22] Facial rejuvenation involving most procedures in the lower eyelid area is technically difficult due to thin skin and high risk of hematomas. There are reports of the significant improvement in skin firmness and elasticity with minimal side effects by monthly PRP injections in patients with actinic elastosis in the lower eyelid area.^[23] In a retrospective study, Kamakura *et al.*^[24] treated 2005 patients having wrinkles or depressed skin areas with a combination of 1 mL PRP injection and 10–20 µg of basic-fibroblast growth factor (bFGF) and reported significant improvement in the wrinkle severity improvement scale. Among reviews, one systematic review has reported beneficial effects of PRP in improving skin culture, dermal thickness, skin elasticity, decreased

wrinkles, the severity of nasolabial folds, erythema, atrophic scars, and melanin levels.^[25] However, the authors also noted the lack of standardization regarding the route of PRP preparation and application. Another systematic review has supported the role of PRP in revascularization, tissue regeneration, and oxidative stress, thereby suggesting its beneficial effects in skin rejuvenation.^[26]

Looking at the currently available evidence, we conclude that PRP is a potentially exciting modality in facial rejuvenation, especially wrinkles owing to its favourable tissue remodelling roles. However, since the doses and treatment regimens of PRP used are not yet standardized, more evidence is needed before this genie can be considered an established therapy in aesthetic dermatology.

Chronic ulcers

The growth factors present in PRP produce modulation of mesenchymal cell recruitment, control proliferation and further promote extra-cellular matrix synthesis during the healing process; thereby suggesting a role in chronic wound healing.

Topical use of PRP has been reported to significantly improve epithelialization in acute and chronic ulcers due to varied etiologies (including stasis, diabetic ulcers, venous, and traumatic etc.).^[27] Upregulation of cyclin A and cyclin-dependent kinase 4 (CDK4) was reported in these patients. Similar beneficial effects of PRP in bilateral elbow ulcers in dermatomyositis have been seen.^[28] Rapid healing of venous ulcers by PRP use was reported in a case series of 17 patients.^[29] A case series reported good efficacy of single dose of subcutaneous PRP, followed by topical PRP gel application in the healing of chronic non-healing ulcers of varied etiologies in 24 patients.^[30] A recent animal study on rabbits reported improvement in wound contraction rates by the combined use of PRP and zinc oxide.^[31]

Lately, PRP has been found to promote healing of trophic ulcers in leprosy patients. One study evaluated the use of topical PRP application under occlusive dressings in 50 leprosy patients with trophic ulcers.^[32] The authors reported complete healing in 92% of patients, with the remaining 8% also showing a reduction in wound size and partial re-epithelialization. Similarly, there are reports of beneficial effects of autologous platelet-rich fibrin matrix (PRFM) in leprosy with chronic nonhealing ulcers.^[33] Thus, PRP seems to be a useful therapy, either alone or in conjunction with other topical therapies, in chronic nonhealing wound ulcers due to varied etiologies.

Acne scars

PRP has a promising adjunct role in soft tissue augmentation and management of scars, especially post-acne scars, which are commonly seen in dermatology outpatient departments. The growth factors of PRP act synergistically with growth factors and collagen induction induced by microneedling techniques.

Table 3: Evidence for the use of PRP in facial rejuvenation

Authors	Study design	Sample size	PRP preparation used	Follow-up	Results
Alam <i>et al.</i> , ^[20] 2018	Parallel, split face, RCT evaluating the effect of intradermal PRP injection compared with normal saline	n=19 (17 females, 2 males)	Automated PRP device (Smart Prep 2 System; Harvest Technologies)	12 months	Single-injection of PRP produced significant improvement in coarse and fine textures.
Aust <i>et al.</i> , ^[23] 2018	A prospective study evaluating the effect of PRP in skin rejuvenation and actinic elastosis in the lower eyelid	n=20 (16 females, 4 males)	Arthrex ACP double syringe system, platelet conc. 2.5 x	4 months	Significant improvement in skin firmness and elasticity with minimal side effects by monthly PRP injections in the lower eyelid area
Everts, Pinto and Girao, ^[21] 2018	A prospective, single-center, open-label study evaluating autologous pure platelet-rich plasma injections for facial skin rejuvenation	n=11 (all females)	Automated PRP (The EmCyte Pure PRP system technology)	6 months	Significant skin rejuvenation in 11 subjects with the use of PRP, by biometric parameters and patient self-assessment scores.
Kamakura <i>et al.</i> , ^[24] 2015	A retrospective study evaluating patients with wrinkles and depressed skin areas treated with a combination of 1 mL PRP injection and 10-20 µg of bFGF	n=2005 (1889 females, 116 males)	Double centrifuged manual method for PRP, a concentration not mentioned	6 months	PRP plus bFGF are effective in treating wrinkles and depressed areas of the skin. Significant improvement in the Wrinkle Severity Improvement Scale
Mehryan <i>et al.</i> , ^[22] 2014	Prospective, single-center, clinical study to assess the efficacy of intradermal PRP on infraorbital dark circles and crow's feet wrinkles	n=10 (all females)	Manual rotation PRP, 1600-1800 g/6 min, then 2000 g/5 min.	3 months	Significant improvement in infraorbital colour homogeneity. No significant changes in melanin content, stratum corneum hydration, wrinkle volume, and visibility index

PRP=Platelet-rich plasma, RCT=Randomized controlled trial, bFGF=Basic fibroblast growth factor

Evidence for use

The recent experimental *ex-vivo* study proposed that in wounded skin culture, autologous PRP had favourable modulation of collagen and elastic fibres with the promotion of skin regeneration and wound repair processes.^[34] Significant improvement in acne scars by the use of PRP alone, as well as in conjunction with microneedling has been shown.^[35] In a study on 55 adult patients with atrophic acne scars, significantly better improvement and better dermatology life quality index (DLQI) scores were reported by the use of derma roller combined with PRP, compared with derma roller alone.^[36]

An *in-vitro* study has already shown that fat grafts mixed with PRP have greater vascularity, fewer cysts and vacuoles, and lesser fibrosis.^[37] Cervelli *et al.*^[38] reported successful treatment of traumatic scars using fat grafts mixed with PRP, followed by skin resurfacing using 1540 nm nonablative laser. In addition, Ozer and Colak^[39] showed significantly better results when PRP was combined with microautologous fat transplantation for facial filling.

Recently, Hesseler and Shyam^[40] conducted a systematic review evaluating the role of PRP in the treatment of acne scars. The authors reported that PRP in conjunction with fractional ablative laser treatment, given in 2–3 sequential sessions at a gap of 1 month, produces significant improvement in acne scar appearance. However, evidence was less supportive of the use of PRP with microneedling.

Thus, the current evidence favours PRP as an adjunctive efficacious modality in acne scars treatment. However, its

use as a stand-alone therapy for this condition needs to be further defined.

Recent indications and upcoming uses for PRP

Vitiligo

Treatment for vitiligo is challenging and a modality of therapies have been employed singly or in combination to stop disease progression and/or promote repigmentation. PRP has a high concentration of growth factors, which may stimulate melanocyte proliferation and repigmentation in the vitiligo lesions, as suggested by some authors.^[41] Fractional carbon dioxide laser has been shown to promote growth factor secretion in producing repigmentation in vitiligo.^[42] A similar role has been postulated for PRP.

Evidence for use

In stable vitiligo patients, autologous transplantation of noncultured epidermal cell suspension (NCES) on the derma-abraded vitiligo patch is a useful therapy. In a double-blinded randomized trial in 21 patients of stable vitiligo, NCES in PRP, followed by autologous transplantation produced significantly better repigmentation and patient satisfaction than suspension in phosphate-buffered solution (PBS).^[43]

In a randomized, prospective study in stable nonsegmental vitiligo patients, a combination of PRP with fraction carbon dioxide laser was more effective in producing repigmentation than PRP alone or fraction carbon dioxide laser alone.^[44]

Although PRP seems to be promising in vitiligo, the evidence is at the primary stage requires further substantiated evidence.

Melasma

PRP has found its use in conditions like melasma, although this is an area for further research. Factors like TGF- β 1 have been shown to decrease melanogenesis.^[45] Further, PDGF increases skin volume and may further supplement skin texture in melanotic conditions.

Some case reports have reported improvement in melasma by use of PRP injections.^[46] Recently, one study evaluated the use of PRP injection in 23 adult melasma patients and reported significant improvement in melasma area and severity index (MASI) and modified melasma area and severity index (mMASI) scores.^[47] The study also compared microneedling versus microinjection techniques of PRP administration in melasma and both were found to be equally efficacious.

Striae distensae

Striae distensae, also known as stretch marks, are esthetically problematic dermal skin lesions often seen on abdomen, buttocks, thighs, and shoulder regions.

One pilot study combined PRP injections with intradermal radiofrequency device and reported good results in female patients with striae distensae.^[48] Transdermal PRP with fractional radiofrequency has been successfully employed in such patients in one study.^[49]

In 2015, a study compared PRP with microdermabrasion in 68 patients having striae distensae.^[50] The study found PRP with microdermabrasion to produce significantly better results than microdermabrasion alone. The results were also better with PRP alone than microdermabrasion alone. Recently, PRP has been reported to produce significantly better improvement in striae distensae compared with topical tretinoin.^[51]

As per a systematic review on striae distensae management, lack of adequate RCTs and relatively small sample size in most studies means drawing definite conclusions about PRP role is still uncertain.^[52]

Lichen sclerosis

Lichen sclerosis is a chronic inflammatory disorder with significant tissue sclerosis and atrophy in the anogenital region. Corticosteroid use, although effective, needs to be used for prolonged periods and surgical techniques have high recurrence rates. PRP injections in conjunction with autologous fat transfer have been found to be effective in lichen sclerosis of the vulva, with no recurrences reported on follow-up up to 24 months.^[53]

In another pilot study on vulvar lichen sclerosis, 5 mL intradermal PRP injections used in two separate

sessions 6 weeks apart produced significantly decreased histopathological inflammation in 12 patients (out of 15).^[54] There was a significant improvement in symptoms and the therapy was well-tolerated.

Lipodermatosclerosis

There has been a case report of beneficial effects of intralesional PRP in a 76-year old man with lipodermatosclerosis refractory to multiple therapies including anabolic steroids, compression therapy, antibiotics, and surgery.^[55] Five cycles of intralesional PRP injections produced significant improvement in induration and complete re-epithelialisation of the ulcers. No recurrence was noted during follow-up for 6 months.

Refractory nail disorders

One study reported the significant benefit of three-weekly intramatrix PRP injections in refractory nail disorders like nail lichen striatus and idiopathic trachyonychia.^[56] While the former responded in 3 weeks, the latter case showed significant improvement in 6 weeks of therapy. No relapses were seen during follow-up for 16 and 20 weeks, respectively.

Summary

Although PRP has been in use for many dermatological indications of late and is often hypothesized as a potentially ground-breaking treatment modality in facial rejuvenation and androgenetic alopecia's, good quality evidence has been lacking so far. Previous reviews^[5] have tried to analyze and summarize the evidence for its use and the present review adds to the growing corpus. We found that PRP did prove to be efficacious in multiple dermatological conditions but there is a general lack of adequate, large randomized controlled trials (RCTs), and the quality of evidence available is not robust. Furthermore, when the studies available so far are analyzed, we find that there is an absence of dose standardization of PRP, as well as the lack of standardized treatment regimens. Even the duration of PRP administration and follow-up in the studies is variable.

Although PRP promises to be a potential elixir for many problematic dermatological indications, the current evidence suggests that PRP works well in combination therapies, especially in indications such as androgenetic alopecia, skin rejuvenation, and chronic ulcers. More evidence is needed, though, to elucidate its role as monotherapy in dermatological disorders.

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Conflicts of interest

There are no conflicts of interest.

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