# Platelet-rich plasma and its utility in medical dermatology-Skin Ulcers

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The field of dermatology has seen numerous therapeutic innovations in the past decade with platelet-rich plasma (PRP), recently garnering significant interest in alopecia, acne scarring, and skin rejuvenation. In other conditions of dermatology, such as chronic wounds and vitiligo, PRP has been investigated but has received less attention. The objective of this literature review was to focus on conditions of medical dermatology and to consolidate the available evidence on PRP for the practicing dermatologist. This review evaluates the literature up to October 31, 2018, and a search was conducted in the PubMed database for “platelet-rich plasma,” “platelet releasate,” “platelet gel,” “platelet-rich fibrin” or “PRP” and “dermatology,” “skin,” “cutaneous,” “wound,” or “ulcer.” In total, 14 articles met the inclusion criteria for this review. In studies representing Levels of Evidence 1b-4 according to the Centre for Evidence-Based Medicine, Oxford, PRP significantly improved wound healing in chronic diabetic ulcers, venous ulcers, pressure ulcers, leprosy ulcers, acute traumatic wounds, and ulcers of multifactorial etiologies. Two studies also documented benefits of adjunctive PRP in stable vitiligo. In chronic wounds of multiple etiologies and vitiligo, PRP warrants further investigation because it represents a potential therapeutic adjunct or alternative with a favorable side effect profile.

## Section snippets

## Methods

The objective of this literature review was to focus on conditions of medical dermatology outside of alopecia, acne scarring, and skin rejuvenation and consolidate the available evidence of PRP for the practicing dermatologist. To identify the evidence up to October 31, 2018, a search was conducted in the PubMed database for “platelet-rich plasma,” “platelet releasate,” “platelet gel,” “platelet-rich fibrin,” or “PRP” and “dermatology,” “skin,” “cutaneous,” “wound,” or “ulcer.” The 547

## Medical dermatology: Ulcers

Chronic wounds are among the most common medical conditions in the general population, affecting nearly 15% of Medicare beneficiaries with an estimated annual cost of $28-$96 billion (USD).[13] Prior studies have evaluated the role of PRP in chronic ulcer therapy and showed mixed results. Earlier studies are difficult to interpret as the description of the PRP isolation method or delivery technique is often unspecified or ambiguous. Other studies were limited by high rates of patient dropout.14,

## Skin ulcers of multifactorial etiology

De Leon et al[16] conducted a large, observational multicenter case series in 200 patients with 285 refractory chronic wounds of a variety of etiologies. Activated autologous P-PRP gel was applied topically once or twice a week. After a mean of 2.8 PRP applications over 2.2 weeks, 86.3% of the wounds responded with an area reduction of 47.5% while 90.5% of the wounds had a 63.6% volume reduction. Specifically, pressure, diabetic, and venous ulcers achieved significantly greater responses than

## Acute traumatic wounds

Kazakos et al[18] conducted an open-label, randomized, controlled trial of 59 patients with acute traumatic wounds (open fractures, closed fractures with skin necrosis, and frictional burns) not requiring flap coverage. Compared with Vaseline Petrolatum Gauze, topical application of activated autologous undefined PRP (uPRP; unknown if leukocyte rich or leukocyte poor) gel weekly for 3 weeks produced early improvements in wound surface area throughout follow-up starting at week 1 ($P = .003$), as

## Chronic diabetic ulcers

Saad Setta et al[19] conducted an open-label, randomized, controlled trial in 21 patients with chronic diabetic ulcers >12 weeks in duration. Patients randomized to twice a week treatment with topical activated autologous L-PRP gel had a faster mean healing time (11.5 weeks) compared with platelet-poor plasma (17 weeks; $P < .005$). Li et al[20] performed a single-blinded, randomized, controlled trial of 117 patients with chronic diabetic ulcers. Patients were randomized to either 12 weeks of

## Pressure ulcers

Ramos-Torrecillas et al[24] conducted an open-label, randomized, clinical trial in 100 patients with pressure ulcers for >8 weeks. Patients were randomized to either standard care only, a single dose of topical activated autologous uPRP on day 0, two doses of activated autologous uPRP on day 0 and day 15, or 2 doses of activated autologous uPRP plus hyaluronic acid on day 0 and day 15. At 36 days, ulcer areas were significantly improved in every treatment group when compared with standard care

## Venous ulcers

Moneib et al[29] performed an open-label, randomized, controlled study in 40 patients with chronic venous leg ulcers of >6 months' duration comparing compression therapy alone to combination with weekly topical activated autologous L-PRP gel for 6 weeks. The activated autologous L-PRP gel significantly improved the mean ulcer area at 6 weeks (67.6% vs 13.7% for controls, $P = .0001$). Complete healing of ulcers was achieved in 35% of patients treated with L-PRP and zero patients in the control

## Leprosy ulcers

Over 2 million people worldwide experience leprosy complications, including sensory loss, leading to trophic ulcers.[30] PRP might contribute to peripheral nerve regeneration and healing of ulcers secondary to neuropathy.31, 32, 33
Anandan et al[34] evaluated weekly topical activated autologous L-PRP for a maximum of 6 sessions for neuropathic ulcers in 50 leprosy patients. At the 3-month follow-up, 92% of patients showed complete re-epithelialization within 6 treatment sessions with a mean healing

## Stable vitiligo

Ibrahim et al[35] explored the use of activated autologous P-PRP combined with narrowband ultraviolet B phototherapy (NB-UVB) for vitiligo. Sixty patients with symmetric vitiligo stable for >12 months underwent NB-UVB alone on the left side and combination therapy with intradermal activated autologous P-PRP injections was performed on the right side. Patients received phototherapy twice a week and P-PRP injections every 2 weeks for a maximum of 4 months. At 3 months posttreatment, 2 independent

## Discussion

This review highlights the utility of PRP in treating ulcers of multiple etiologies across 12 studies of a range of Levels of Evidence (1b-4a) including 1051 patients (Table II).16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 29, 34, 35, 36 In 10 of 12 reviewed studies, activated PRP was used, and in 2 studies, L-PRF was used. In 6 of 12 studies, L-PRP was investigated, and in 3 studies, uPRP was used. But the only study achieving Level of Evidence 1b utilized autologous L-PRF applied weekly to