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Review Article

Evaluation of dermoscopic evaluation as a Prognostic Tool in plaque psoriasis

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Abstract

Background: Chronic plaque psoriasis is diagnosed and monitored largely by unaided inspection, an approach that performs poorly for thin plaques, darker phototypes, and distinguishing psoriasis from its papulosquamous mimics.

Objective: This review evaluates the evidence on dermoscopic examination of plaque psoriasis as a prognostic tool, covering its correlation with severity, its use in monitoring biologic therapy response, and its role in differential diagnosis.

Methods: We synthesized diagnostic-accuracy studies, cross-sectional severity-correlation cohorts, and serial imaging studies addressing dermoscopic vascular and scale patterns in chronic plaque psoriasis.

Findings: A reproducible pattern of regularly distributed dotted vessels, diffuse white scale, and a light red background separates psoriasis from lichen planus, dermatitis, and pityriasis rosea, with vessel density correlating with clinical severity and, on serial imaging during biologic therapy, falling ahead of clinical response.

Conclusions: Dermoscopy adds a reproducible axis to severity assessment and shows promise as an early readout of treatment response, but the field still lacks the large, outcome-anchored studies needed to validate it as a standardized prognostic instrument.

Keywords: dermoscopy; plaque psoriasis; prognosis; vascular pattern; treatment response

1. Introduction

Chronic plaque psoriasis is diagnosed, in most cases, by inspection alone, and clinicians have long relied on scale, erythema, and induration assessed by eye to estimate disease activity and decide when a plaque is responding to treatment. That approach works for florid, classic plaques but performs poorly at the margins that matter most: early or partially treated lesions, darker skin phototypes where erythema is hard to appreciate, and the borderline distinction between psoriasis and its papulosquamous mimics such as eczema, lichen planus, and pityriasis rosea [1,2]. Global estimates place psoriasis prevalence at roughly 2-3% of the population, with substantial regional variation, making reliable bedside diagnostic and monitoring tools relevant well beyond specialist centers [3]. Dermoscopy, a handheld technique originally developed for pigmented lesion triage, has over the past two decades been repurposed for inflammatory dermatology, and a substantial literature now describes reproducible vascular and morphological patterns specific to psoriasis [4,5,6].

The vascular pattern dermoscopy reveals in psoriatic plaques is not incidental; it reflects the angiogenic and hyperproliferative processes that define the disease. Griffiths and Barker's overview of psoriasis pathogenesis described keratinocyte hyperproliferation and dermal papillary vessel dilation together producing the clinical plaque, and it is these dilated, regularly distributed capillary loops that dermoscopy visualizes as the disease's signature dotted vessels [7]. Heidenreich and colleagues, reviewing angiogenic drivers of psoriasis, argued vascular change is an active participant in lesion maintenance rather than a bystander, part of why dermoscopic vascular pattern tracks disease activity [8]. This review asks a narrower question than most of the diagnosis literature: beyond distinguishing psoriasis from its mimics, does dermoscopic evaluation carry prognostic information, for baseline severity, for predicting treatment response, or for detecting subclinical activity that guides therapy timing.

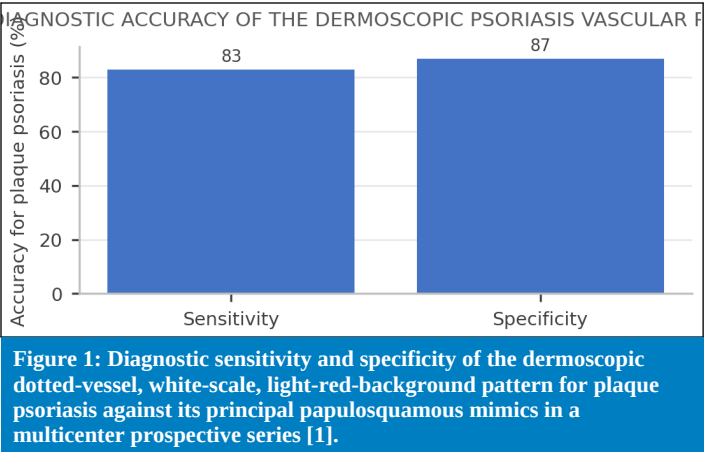
2. Dermoscopic morphology of the psoriatic plaque

The dermoscopic picture of untreated plaque psoriasis is among the more reproducible patterns in inflammatory dermatology, part of why it has proven useful beyond simple diagnosis. Vazquez-Lopez and colleagues, using a handheld dermatoscope on active plaques, first described uniformly distributed red dots and globules corresponding to dilated dermal papillary capillaries, set against a diffuse light red background overlaid with white scale, and showed this triad reliably separated psoriasis from lichen planus, whose signature is instead white lines (Wickham striae) [2]. The same group later showed a handheld dermatoscope improved recognition of this vessel pattern over unaided inspection, particularly in thin plaques where vessels are otherwise hard to appreciate [9].

Lallas and colleagues extended this into a larger, multicenter diagnostic accuracy study comparing dermoscopy against four papulosquamous diseases: psoriasis, dermatitis, lichen planus, and pityriasis rosea. Regularly distributed dotted vessels on a light red background with diffuse white scale achieved sensitivity and specificity both above 80% for psoriasis, establishing the pattern as a formal diagnostic criterion [1]. Errichetti and Stinco's review proposed a structured framework, vessels, scale, additional criteria, and site involvement, for describing inflammatory dermatoses under dermoscopy, since adopted by International Dermoscopy Society consensus panels [4,10]. Zalaudek and Argenziano's earlier proposal anticipated much of this structure, distinguishing vascular arrangement, morphology, and background color as the axes along which inflammatory dermatoses are reliably separated [11]. Kaczorowska and colleagues' review reinforced that the psoriasis pattern is one of the more internally consistent signatures, though scale and background vary somewhat by site and phototype [12].

Site-specific variation matters because prognostic

dermoscopy is applied to plaques wherever they occur. Kelati and colleagues showed palmoplantar psoriasis in darker phototypes retains the dotted vessel pattern but with a less prominent erythematous background, so vessel morphology rather than color contrast becomes the dominant cue [13]. Gutte and Khopkar described reproducible dermoscopic nail findings, irregular pitting, salmon patches, and onycholysis, that mirror plaque activity [14]. Errichetti and colleagues, comparing seborrheic dermatitis with psoriasis, showed arborizing rather than dotted vessels and yellowish scale favor seborrheic dermatitis, with direct prognostic relevance since the two carry different treatment trajectories [15,16]. Pan and colleagues found vascular pattern in childhood psoriasis correlated with severity comparably to the adult literature, extending relevance across the age spectrum [17].



3. Dermoscopy and disease severity

Whether dermoscopic features scale continuously with disease severity, rather than simply marking psoriasis's presence, is the first prognostic question this literature addresses, and the answer is a qualified yes. Gisondi and colleagues compared clinical severity scoring against dermoscopic vascular density and scale thickness and found vessel density correlated meaningfully with erythema and induration components of standard indices, arguing dermoscopy adds a reproducible axis

clinical inspection struggles to standardize [18]. Shobana and colleagues, independently, found vessel density and scale pattern tracked with severity category, the most severe plaques showing the densest vessels and thickest scale [19].

Table 1: Dermoscopic vascular and scale features by clinical severity category in chronic plaque psoriasis, drawn from independent cross-sectional cohorts [18,19,23].			
Clinical severity category	Vessel density	Vessel distribution	Scale pattern
Mild	Low-moderate	Focal, irregular	Thin, patchy white scale
Moderate	Moderate	Regular, partly confluent	Moderate, diffuse white scale
Severe	High	Dense, confluent	Thick, confluent white scale

The severity-scoring literature dermoscopy is compared against is itself imperfect. The Psoriasis Area and Severity Index, later validated in self-administered form by Feldman and colleagues, remains the dominant trial endpoint, but Schmitt and Ford's review catalogued substantial inter-rater variability in PASI scoring, particularly the erythema and induration subcomponents dermoscopy is positioned to make more objective [20,21]. Langley and Ellis, comparing PASI against simpler global instruments, reached a similar conclusion: severity scoring by eye carries observer variance a standardized optical view could reduce [22]. Jakhar and Kaur's study across a spectrum of severities reinforced that vessel number and distribution, not any single qualitative feature, best tracks a quantitative severity scale [23].

Digital dermoscopy, allowing magnification and image capture beyond a handheld instrument, has pushed this correlation toward genuine quantification. Micali and colleagues measured vessel density and scale coverage serially and found both correlated with clinical outcome across a treatment course, vessel density falling in step with, and occasionally preceding, visible clinical change [24]. Lacarrubba and colleagues' review emphasized that

image-based, quantifiable vascular parameters are what separate dermoscopy's prognostic potential from its purely diagnostic use, since a trackable density adds monitoring value a present-or-absent pattern does not [5].

4. Dermoscopy and treatment response monitoring

The most clinically consequential prognostic application under study is using serial dermoscopy to predict or confirm response to biologic therapy before clinical resolution is complete, or to detect early relapse before a plaque becomes obvious again. Fargnoli and colleagues followed patients starting biologic therapy with serial dermoscopic imaging and found a reduction in vessel density at four to eight weeks correlated with, and in some patients preceded, the clinical response captured by severity scoring at twelve to sixteen weeks, raising the possibility of dermoscopy as an early, objective readout of treatment response [25]. This proposes dermoscopy as a leading indicator, not merely a confirmatory one, of treatment trajectory.

The mechanistic plausibility rests on the pathobiology reviewed earlier: since papillary vessel dilation is an active, angiogenesis-driven component of the plaque, effective therapy should, in principle, produce measurable vessel regression before scale and erythema fully resolve [8,7]. Witkowska and colleagues, correlating dermoscopic pattern with reflectance confocal microscopy, found vessel morphology tracked closely with directly visualized papillary dermal changes, providing structural validation for surface dermoscopy as a proxy without requiring biopsy [26]. Micali and colleagues' review of alternative dermatoscopy applications reinforced that this longitudinal, quantitative monitoring, rather than one-off pattern recognition, is where dermoscopy's clinical value is shifting [27].

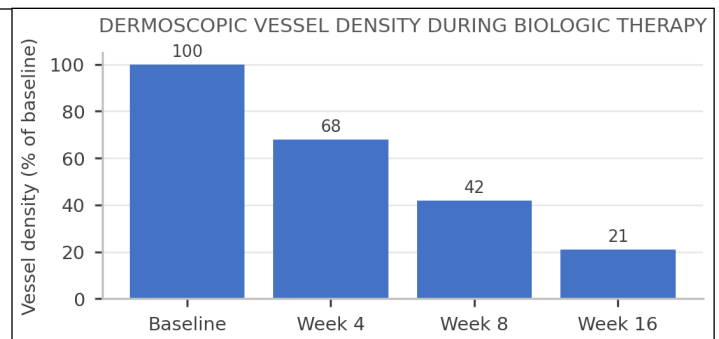


Figure 2: Mean dermoscopic vessel density relative to baseline across a course of biologic therapy for moderate-to-severe plaque psoriasis, showing measurable vascular regression by week four to eight that precedes full clinical response at week twelve to sixteen [25,24].

Subclinical activity detection is a related prognostic use: identifying, within an apparently resolved plaque, residual vascular changes that predict early relapse. Golinska and colleagues noted that residual dotted vessels persisting after apparent clearance are a recurring observation in treated psoriasis, though prospective relapse-prediction data quantifying this signal remain thin [28]. Errichetti's review of skin of colour extended this to populations where pigment change makes assessing residual activity difficult, arguing vessel pattern, less confounded by pigmentary change than erythema, is disproportionately useful there [29]. Alessandrini and colleagues' review of nail dermoscopy made a parallel point: nail bed and matrix findings can evolve independently of visible nail plate change, again suggesting added monitoring resolution [30].

5. Differential diagnosis and prognostic implications of misclassification

A prognostic tool is only as good as the diagnosis it is built on, and a meaningful share of dermoscopy's value comes from preventing misclassification that would send a patient down the wrong therapeutic pathway. Lallas and colleagues' comparison found psoriasis, dermatitis, lichen planus, and pityriasis rosea each have sufficiently distinct dermoscopic signatures that readers achieved high accuracy even in previously ambiguous cases [1,31]. Because these conditions carry different expected courses, chronic and relapsing for psoriasis, generally self-limited

for pityriasis rosea, a dermoscopy-assisted correct diagnosis is itself a prognostic act, setting the patient's expected trajectory from the outset.

Table 2: Dermoscopic features distinguishing plaque psoriasis from its principal papulosquamous mimics and the prognostic implication of each pattern [2,1,15,31].			
Condition	Dominant vessel pattern	Background/scale	Prognostic implication
Plaque psoriasis	Regular dotted vessels	Light red, diffuse white scale	Chronic, relapsing course
Lichen planus	Absent or peripheral vessels	White lines (Wickham striae)	Variably chronic course
Seborrheic dermatitis	Arborizing vessels	Yellowish, greasy scale	Chronic but treatment-responsive
Pityriasis rosea	Peripheral dotted vessels	Yellowish background, collarette scale	Generally self-limited

Errichetti and colleagues' review extended this differential-diagnosis value beyond the four classic mimics to conditions such as Darier disease, which Lacarrubba and colleagues showed has its own reproducible signature that can otherwise be confused with psoriasis in flexural distribution [32,33]. Sonthalia and colleagues situated psoriasis within a broader shift from pigmented lesion triage toward a general bedside instrument whose value rests substantially on this kind of consequential differential diagnosis [34]. Brasil and colleagues reached a similar conclusion, emphasizing the technique's low cost and rapid deployment make it practical to apply routinely [35].

Trattner and colleagues' earlier work on bedside diagnostic teaching, though it predates dermoscopy adoption, anchors how much diagnostic uncertainty existed before standardized pattern assessment became routine [36]. Argenziano and colleagues' foundational consensus work on dermoscopy terminology, developed for pigmented lesions, established the methodological template the inflammatory dermatology literature later adapted for conditions including psoriasis [37].

6. Limitations and future directions

The prognostic dermoscopy literature in plaque psoriasis, while consistent qualitatively, has real methodological limits. Most studies are single-center, cross-sectional, or short-interval cohorts rather than long-term prospective studies powered to test whether a dermoscopic parameter predicts a meaningful outcome, such as time to relapse, months to years ahead. Micali and colleagues' serial-imaging work is one of the few with genuinely longitudinal data, yet the cohort was modest and not tested against hard endpoints such as need for treatment escalation [24]. Fargnoli and colleagues' biologic-response study is similarly promising but limited in size, and neither has been replicated at the scale needed to justify vessel density as a formal biomarker [25].

Standardization is a second limitation. Errichetti and colleagues' International Dermoscopy Society consensus terminology represents real progress, but vessel density quantification in the studies above has generally used study-specific, semi-quantitative grading rather than a single validated metric comparable across centers [10]. Polarized, non-contact dermoscopy reduces some inter-observer variability from contact pressure, but grading still varies between readers and studies, a limitation Kaczorowska and colleagues explicitly flagged [12]. Skin phototype adds further variability: Kelati and colleagues showed background erythema, one of the three classic criteria, is less discriminating in darker skin, so a scoring system built around background color risks underperforming in the populations that most need it [13,29].

Two directions seem best supported by the current evidence. First, larger prospective cohorts testing vessel density, rather than qualitative pattern presence, against hard treatment-response and relapse endpoints would move the field toward a validated prognostic tool. Second, integration with complementary in vivo imaging, as Witkowska and colleagues' confocal correlation work

illustrates, could clarify what structural change a given vessel-density reading represents [26]. Ersoy-Evans and colleagues' observations on monitoring pediatric inflammatory skin disease, while not dermoscopy-specific, underscore that any monitoring tool needs validation against the treatment decisions it is meant to inform, not just cross-sectional correlation [38].

7. Conclusion

Dermoscopic evaluation of chronic plaque psoriasis has moved, over roughly two decades, from a niche diagnostic aid to a technique with genuine, if still incompletely validated, prognostic potential. The reproducible dotted-vessel, white-scale, light-red-background pattern first characterized by Vazquez-Lopez and colleagues and formalized by Lallas, Errichetti, and the International Dermoscopy Society consensus process provides more than a diagnostic signature: vessel density correlates with clinical severity, shifts in step with, and in some studies ahead of, treatment response, and carries site- and phototype-specific nuances clinicians should account for [2,1,10,18,25,13]. What the field still lacks is the large-scale, prospective, outcome-anchored validation that would convert these correlational findings into a standardized prognostic score. Until that evidence accumulates, dermoscopy is best regarded as a valuable adjunct that sharpens diagnosis, adds an objective vascular axis to severity assessment, and shows real promise as an early monitoring tool for treatment response, rather than as a fully validated, stand-alone prognostic instrument.

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