Dermatology Practical & Conceptual

# Dermatoscopic Patterns in Keloid, Hypertrophic, and Atrophic Scars: Cross-Sectional Analysis and Clinical Correlation

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## Introduction

Keloids, hypertrophic scars, and atrophic scars represent distinct forms of abnormal wound healing. Differentiating between these entities is often based on clinical and histopathological criteria. Dermatoscopy has been suggested as a supportive tool in this differentiation, yet published data remain limited. While earlier studies proposed that dermatoscopy could assist in distinguishing scar subtypes, we aimed to clarify its role by analyzing a broad set of dermatoscopic images. Our findings demonstrate that dermatoscopy is more effective for evaluating scar activity and maturation than for classifying scar types.

## Case Presentation

A dermatoscopic evaluation was conducted on 68 scars (38 keloids, 20 hypertrophic scars, and 10 atrophic scars) at a dermatology outpatient clinic using polarized digital dermatoscopy (Fotofinder©). Clinical and dermatoscopic findings focused on vascular patterns, color, and the presence or absence of skin appendages.

In keloids (N=38), arborizing (branched) vessels were observed in 36.8% of cases, often associated with white or yellow structureless areas, indicating dense collagen nodules. Dotted vessels were less frequent. Mature keloids showed reduced vascularity, and in some cases, reappearance of trapped hair follicles, suggesting a transition to a regressive phase.

In hypertrophic scars (N=20), thin linear vessels were the most common vascular pattern (50%), along with pinkish or reddish areas and parallel white bands, likely corresponding to compact collagen bundles.

Atrophic scars (N=10), often following intralesional corticosteroid therapy, exhibited prominent arborizing vessels (70%) and dermal thinning. These scars lacked curved or dotted vessels, helping differentiate them from proliferative-phase scars.

Statistical analysis revealed that vascular patterns (arborizing, linear, dotted) were more strongly correlated with scar activity (e.g., inflammation, growth phase) than with scar subtype (Figure 1). Dermatoscopy also revealed the reappearance of pilosebaceous units during scar regression, serving as a useful marker of scar maturation (Figure 2).

Dermatoscopic findings are summarized in Table 1.

## Conclusions

Dermatoscopy is not reliable for distinguishing between keloids and hypertrophic scars based solely on morphology. However, its true clinical utility lies in tracking scar dynamics, such as vascular patterns, color changes, and follicular visibility, which reflect scar activity and maturation phase rather than classification.

Keloids in active growth show arborizing vessels and yellow-white structureless areas, while reduced vascularity and reappearance of follicles indicate regression. Hypertrophic

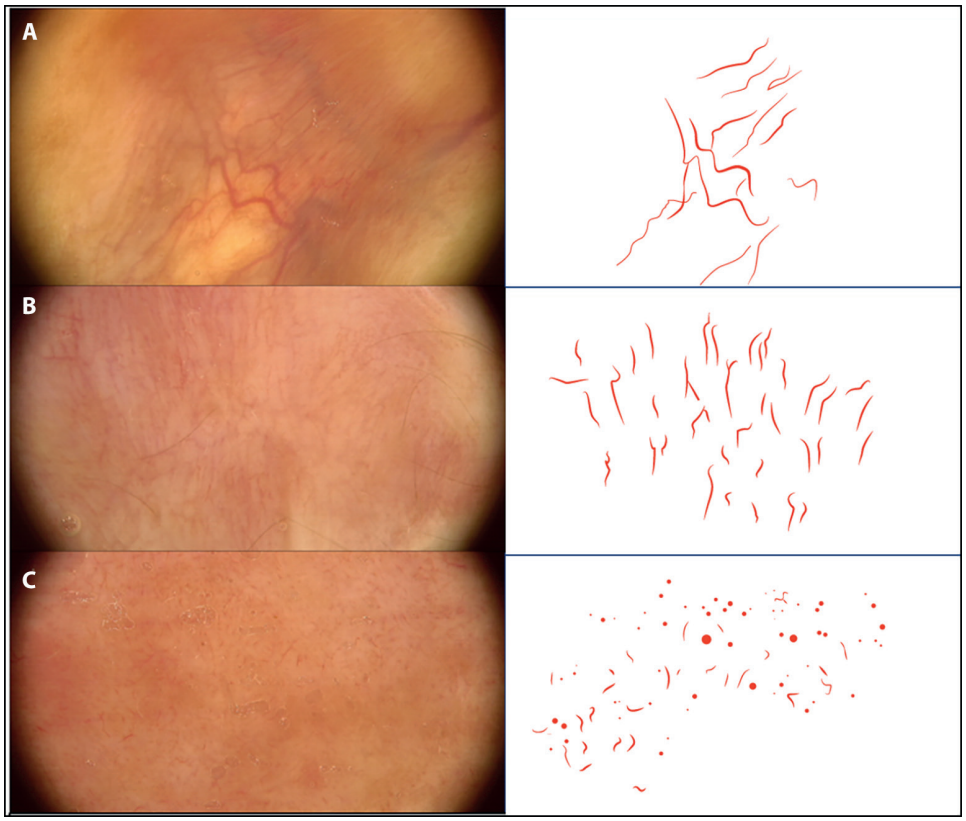


**Figure 1.** Dermatoscopic patterns of curved, crossing and arborizing (A), linear (B) and dotted (C) vessels. Branched vessels increased significantly across scar types ($P$=0.005), especially in atrophic lesions. Linear and curved vessels showed progressive trends by scar type.

**Table 1. Dermatoscopic features of patients with atrophic, hypertrophic, and keloid Scars.**

| General Dermoscopic Findings | | | |
|---|---|---|---|
| Finding | Keloid Scars (N=38) | Hypertrophic Scars (N=20) | Atrophic Scars (N=9) |
| Erythematous areas | 9 (23.7%) | 3 (15.0%) | 2 (22.2%) |
| **Blood Vessels** | | | |
| Vascular Pattern | Keloid Scars (N=38) | Hypertrophic Scars (N=20) | Atrophic Scars (N=9) |
| Arborizing (branched) vessels | 14 (36.8%) | 2 (10.0%) | 6 (66.7%) |
| Linear vessels | 11 (28.9%) | 10 (50.0%) | 1 (11.1%) |
| Dotted / comma-like (curved) vessels | 6 (15.8%) | 0 (0.0%) | 1 (11.1%) |

Abbreviations: N: number of lesions; values in parentheses represent percentages. Statistical analysis: Fisher's exact test showed a significant association between arboriform (branched) vessels and scar type ($P$=0.005). No statistically significant association was found for erythematous areas ($P$=0.69), linear vessels ($P$=0.10), or dotted/comma-like (curved) vessels ($P$=0.13).

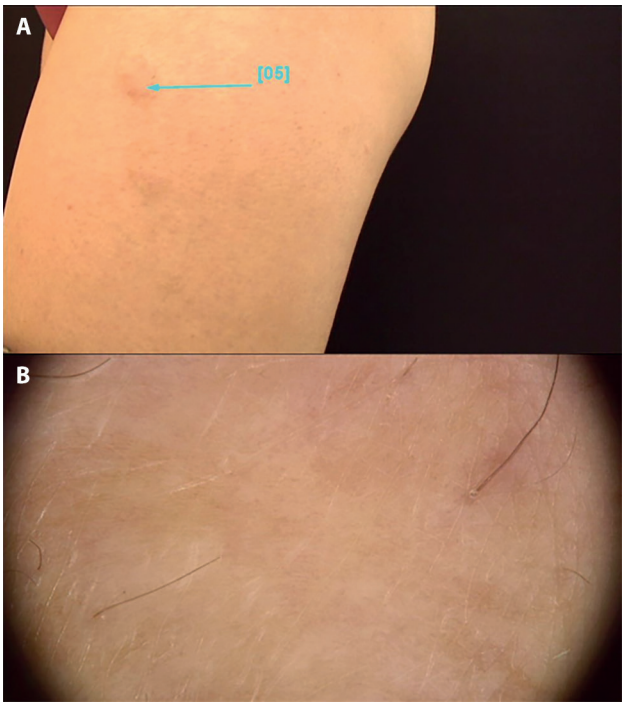


**Figure 2.** (A) Macroscopic image showing a treated scar on the left thigh. (B) Under dermoscopy, hair follicles are identified extruding from non-hypertrophic scar tissue. As scar thickness decreases, dermatoscopy reveals the return of previously trapped hair follicles. Preserving these structures during treatment may support repigmentation and enhance the scar's cosmetic appearance.

scars show linear vessels that diminish with maturation along with increased follicular visibility. In atrophic scars, prominent arborizing vessels are typically shown due to steroid-induced dermal thinning, although arborizing vessels, reminiscent of a distorted reticular vascular pattern, may be indicative of the emergence of the reticular vascular pattern of superficial plexus of normal skin in the maturation of a scar.

Dermatoscopy thus serves as a noninvasive, practical tool for monitoring scar progression and guiding treatment decisions, particularly timing and selection of adjunctive therapies like laser, cryotherapy, or energy-based devices.

Dermatoscopy enhances the clinical assessment of abnormal scars by identifying features linked to scar activity and evolution. Though it cannot differentiate scar types definitively, it provides valuable insights into scar maturation and treatment response, supporting personalized and optimized care.

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