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## REVIEW

# Vascular Patterns in Dermoscopy<sup>☆</sup>

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### PALABRAS CLAVE

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Vascularización

**Abstract** Under the right conditions, dermoscopy allows us to observe the vascular features of many different types of skin lesions. The visualization and identification of vessels with a characteristic morphology can be the key to diagnosis, especially in hypopigmented lesions in which the typical pigmented structures are not visible.

Some of the more characteristic associations are the presence of crown vessels in sebaceous hyperplasia, arborizing telangiectasias in basal cell carcinoma, comma-shaped vessels in intra-dermal and compound nevi, dotted vessels in Spitz nevi and melanoma, and hairpin vessels in seborrheic keratoses.

The recognition of distinctive vascular features can be of great help in the diagnosis of many types of skin lesions, and very often such patterns are the only key to the diagnosis of melanoma.

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### Vascularización en dermatoscopia

**Resumen** La dermatoscopia permite observar, en las condiciones adecuadas, la vascularización presente en las lesiones cutáneas de muy diversa índole. La visualización e identificación de vasos de morfología característica puede ser la clave en el diagnóstico de determinadas lesiones, especialmente en el caso de aquellas hipopigmentadas, en las que no es posible identificar las estructuras pigmentadas clásicas.

Así pues, algunas de las asociaciones más características son la presencia de vasos «en corona» en la hiperplasia sebácea, las «telangiectasias arboriformes» en el carcinoma basocelular, los

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vasos «en coma» en los nevos intradérmicos y compuestos, los vasos «en cabeza de alfiler» en los nevos de Spitz o melanoma, o los vasos «en horquilla» en las queratosis seborreicas.

El reconocimiento de estructuras vasculares distintivas puede ser de gran ayuda para el diagnóstico de numerosas lesiones. A menudo, constituyen la única clave para el diagnóstico del melanoma.

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## Introduction

Dermoscopy is a noninvasive diagnostic technique that allows us to visualize morphologic features invisible to the naked eye; it combines a method that renders the corneal layer of the skin translucent with an optical system that magnifies the image projected onto the retina.<sup>1-4</sup>

Dermoscopy has become a routine technique in dermatology practice in the last decade and has contributed to our improved knowledge of the morphology of numerous cutaneous lesions.<sup>5</sup> Additionally, it permits closer follow-up of patients with multiple melanocytic nevi and has substantially improved the accuracy of the clinical diagnosis of pigmented and nonpigmented cutaneous lesions.

The color seen through a dermoscope depends on various factors. The 2 main chromophores detected are melanin, which appears as a black, brown, bluish, or grayish color depending on its depth in the skin, and hemoglobin, which can exhibit red, bluish, or even purple tones, depending on its depth, degree of oxidation, and the presence or absence of thrombosis.<sup>6</sup>

In histological examination, it is difficult to fully appreciate the morphologic features of vessels as histology provides a vertical view of sections of lesions; dermoscopy, by contrast, provides a horizontal view of the lesion, allowing the identification of a wide variety of vascular structures, each with characteristic morphologic and architectural features, that can be of enormous diagnostic value as the technique provides additional information to that obtained in the traditional 2-step approach (melanocytic vs non-melanocytic lesions and benign vs malignant lesions). The examination of vessels is of particular interest in the diagnosis of nonpigmented lesions, where vascular features are often the only clues that suggest the presence of a melanoma.<sup>7</sup>

## Technical Considerations

The identification and evaluation of vascular structures on dermoscopy depends largely on the optical system and examination technique used. There are several important aspects to consider: the method (contact dermoscopy vs polarized light dermoscopy), the resolution of the dermoscope, and the choice of immersion fluid.<sup>6</sup>

In contact dermoscopy, the choice of an appropriate immersion fluid (the fluid placed between the skin and the

glass plate of the dermoscope) and the correct use of the optical system are key to obtaining a clear image of tumor vessels as the closer these are to the surface, the more likely it is that the pressure on the skin will compress the vessels. When a contact dermoscope is used, it is thus essential to apply minimal pressure to prevent the collapse of vessels.

A range of immersion fluids can be used, including water, alcohol, immersion oil, and ultrasound gel. When examining vessels without polarized light, ultrasound gel is the best option thanks to its high viscosity. Less viscous fluids tend to flow off and they also absorb less pressure.

Immersion or interface fluids are not required in polarized light dermoscopy, although they can be useful in lesions where hyperkeratosis or crusting result in considerable refraction that makes it difficult to visualize the structures clearly.<sup>8,9</sup> In such cases, the use of an immersion fluid helps to reduce the refraction of light.

Another important aspect is the magnification power of the dermoscope. A magnification of at least 30x is recommended for visualizing vascular structures as very small capillaries are difficult to analyze at lower magnifications.

Unfortunately, most of the hand-held dermoscopes available produce magnifications of between 10x and 20x, making it very complicated to visualize vessels correctly.

In digital systems, video camera resolution is also a limitation when it comes to evaluating vascular structures, and in our experience, handheld devices offer a much sharper image than some of the video cameras used in digital dermoscopy, except at the highest magnifications.

There are also digital photography dermoscopic systems that can be coupled to cameras to produce high-quality images. Examples are the Heine Delta 20 dermatoscope and the DermLite PhotoSystem.

## General Considerations

Vascular structures show up better in hypopigmented or nonpigmented lesions, or in lighter areas of pigmented tumors.

The most important chromophore in nonpigmented cutaneous tumors is hemoglobin, a pigment found in the erythrocytes of the vascular lumen.<sup>7</sup>

Because dermoscopy provides a horizontal view of the skin, vessels that run parallel to the skin surface are visualized as lines, while those that run perpendicularly are generally viewed as dots, or even loops.

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