

# Dermatoscopy Instrumental Update

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## KEYWORDS

• Dermatoscopy • Dermoscopy • Videodermatoscopy • Videomicroscopy • Instrumentation

## KEY POINTS

- Dermatoscopy is a non-invasive technique used for the evaluation of pigmented (melanocytic and nonmelanocytic) skin lesions and in several dermatology fields, including inflammatory disorders, infectious diseases, and hair and nails abnormalities.
- The handheld dermatoscope is the most used device because it is user-friendly and relatively inexpensive. It allows 10 times magnification and may be connected to digital cameras and/or smartphones.
- Videodermatoscopes are more expensive devices that allow higher magnifications (up to 1000 times) and simplify the process of image storage, analysis, and retrieval.

## INTRODUCTION

Dermatoscopy (or dermoscopy) is a noninvasive technique that allows in vivo, magnified observation of skin details and structures not visible to the naked eye. It was first used for the evaluation of pigmented (melanocytic and non-melanocytic) skin lesions but currently its use has been extended to several dermatology fields, including inflammatory disorders, infectious diseases, and hair and nails abnormalities.<sup>1</sup> Dermatoscopy may be performed using handheld devices or computer-assisted digital systems or videodermatoscopes.

## HANDHELD DERMATOSCOPY

The handheld dermatoscope represents the most used device because it is user-friendly and relatively inexpensive. It is not a mere magnifying glass but a more complex instrument that allows the visualization of the cutaneous microstructures of the different skin layers, from the surface to the mid-dermis.<sup>2,3</sup> These microstructures appear of different colors, depending on their composition and depth. Because they are observed from the top, they appear superimposed.

A wide variety of handheld dermatoscopes are commercially available with an approximate cost of 1000 Euros (**Table 1**).

The classic handheld dermatoscope includes a high-quality lens that generally allows 10 times magnification and a transilluminating lighting system that uses an incident light source (at an angle of  $\sim 30^\circ$ – $45^\circ$ ). To overcome the light scattering on the skin surface, a medium (eg. oil, alcohol, glycerin, water) at the interface between the skin and the device's glass slide is required (epiluminescence technique). This immersion technique makes the skin surface optically homogeneous and translucent, and allows the observation of the deeper structures.<sup>2,3</sup> Because the epiluminescence technique requires contact between the device and the skin, it has the disadvantage of compressing the microvasculature. Moreover, the instrument needs to be cleaned after the observation of each patient, especially in case of evaluation of contagious disorders (eg. warts, molluscum contagiosum, scabies). In some cases, the use of dermatoscopy without the immersion fluid (dry dermatoscopy) is recommended, including the evaluation of scaling, follicular hyperkeratosis, hair shaft disorders, and nail plate surface.<sup>4,5</sup>

Other handheld devices are provided with polarized light that absorbs all the scattered waves. These instruments do not require the use of a liquid medium and offer the capability of viewing the skin while avoiding the surface contact

Disclosures: None.

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Dermatol Clin ■ (2018) ■–■

<https://doi.org/10.1016/j.det.2018.05.001>

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**Table 1**  
Main available handheld dermatoscopes

Name	Company
<b>Handheld Dermatoscopes (×10)</b>	
Dermatoscope Holtex	Holtex (Aix en Provence, France)
Dermatoscope compact	ProximaMedTech (Cokot, Serbia)
DermLite	3Gen (San Juan Capistrano, USA)
DermaGenius ultra	Dermoscan (Regensburg, Germany)
Heine Delta	Heine (Dover, USA)
Horus	Miis (Hsinchu, Taiwan)
IDS-1100	Illuco (Gunpo-si, South Korea)
Kawe	Kirchner & Wilhelm GmbH + Co. KG (Asperg, Germany)
MicroDERM	Visiomed AG (Bielefeld, Germany)
Orion Dermatoscope	Sklar Surgical Instruments (West Chester, USA)
Proscope	American Diagnostic Corporation (Hauppauge, USA)
Ri-derma	Riester (Jungingen, Germany)
Sigma 1000	Medical devices Ltd (Ugoki, Pakistan)
Veos	Canfield (Parsippany, USA)
<b>Dermatoscopes with an integrated camera</b>	
Dermaview	3Tmedical (Camposano, Italy)
DermLite Foto	3Gen (San Juan Capistrano, USA)
LiteScope kit	Quantificare (Valbonne, France)
Photomax pro	Derma Medical (Vienna, Austria)
Veos SLR	Canfield (Parsippany, USA)
<b>Dermatoscopes with camera/smartphone adapter</b>	
DermLite connection kit	3Gen (San Juan Capistrano, USA)
DermaGenius pro	Dermoscan (Regensburg, Germany)
Handyscope	FotoFinder (Bad Birnbach, Germany)
Heine iC1	Heine (Dover, USA)

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**Table 1**  
(continued)

Name	Company
IDS-1100 adapter	Illuco (Gunpo-si, South Korea)
MoleScope	MetaOptima (Vancouver, Canada)
Veos DS3	Canfield (Parsippany, USA)

(noncontact dermatoscopy). This modality is especially useful in cases of infectious disorders.

A study comparing nonpolarized and polarized devices concluded that there are similarities, as well as differences, in the visualization of skin lesions.<sup>6</sup> The investigators observed that, in general, nonpolarized dermatoscopy revealed superficial features and polarized dermatoscopy revealed deeper structures. They concluded that the use of both methods can provide complementary information.<sup>6</sup> The same conclusions were reported in another study comparing polarized and nonpolarized dermatoscopy for hair and scalp disorders. Certain features, such as vascular patterns, scaling, and reticular pigmentation, were better appreciated in a polarized mode, whereas others, such as black dots and tapered hair, were better documented in a nonpolarized mode.<sup>7</sup>

Some handheld dermatoscope devices are equipped with both nonpolarized and polarized light, providing the capability of viewing the skin both with and without a liquid interface and direct skin contact.

Although handheld devices do not allow image storage, this may be obtained by connecting the dermatoscope to a digital camera or a smartphone. Some manufacturing companies provide specially designed adapters for this purpose (Figs. 1 and 2; Table 1).



**Fig. 1.** Handheld dermatoscope and adapter for connection to a digital camera.

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