

## Not All Polarized-light Dermatoscopes May Display Diagnostically Critical Polarizing-specific Features

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**Key words:** dermoscopy, dermatoscopy, shiny white structures, polarizing-specific white lines

**Citation:** Whybrew C, Pietkiewicz P, Kohut I, Chia JC, Akay BN, Rosendahl C. Not all polarized-light dermatoscopes may display diagnostically critical polarizing-specific features. *Dermatol Pract Concept*. 2022;12(4):e2022250. DOI: <https://doi.org/10.5826/dpc.1204a250>

**Accepted:** April 27, 2022; **Published:** October 2022

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**Funding:** None.

**Competing interests:** None.

**Authorship:** All authors have contributed significantly to this publication.

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### Introduction

Since the introduction of polarized-light dermatoscopes it has become evident that there are some fundamental differences in image characteristics, in comparison to those provided by non-polarized dermatoscopy [1].

Non-polarized dermatoscopy provides color rendition without dilution of colors such as gray and blue by polarizing filters, and it provides a clear display of white clods and dots (milia-like cysts) in seborrheic keratoses [1-3].

Polarized dermatoscopy on the other hand displays features not seen in non-polarized dermatoscopy, including

shiny white structures/streaks [4] (defined as short, bright, white lines distributed in a parallel or orthogonal orientation, which can only be seen with polarized dermatoscopy), four-dot clods (rosettes) and polarizing-specific structureless areas [4].

Each of these polarizing-specific features are known to have diagnostic relevance, but notably, it has been shown that shiny white structures/streaks can be critical in the diagnosis of melanoma [5] and in a meta-analysis they have been shown to have the equal highest odds ratio (OR) of 6.7 for the diagnosis of melanoma, compared to pseudopods (equal), irregular pigmentation (OR 6.4), blue-white veil (OR 6.3) and peppering (OR 6.3) [4].

## Case Presentation

A 69-year-old woman with Fitzpatrick phototype-2 skin presented with a pigmented skin lesion on the ankle. Dermatoscopic examination with six different dermatoscopes revealed a chaotic pattern with clues to malignancy including white lines in non-polarized mode with all dermatoscopes, as well as shiny white lines/streaks in polarized mode with five dermatoscopes (Figures 1 and 2). Dermatopathology confirmed superficial spreading melanoma in situ.

Prior to biopsy, multiple images were taken with the six dermatoscopes coupled with 2 different camera devices. Because polarizing-specific features can be angle-dependent, for image acquisition each dermatoscope was rotated each time it was used in polarizing mode to produce the greatest display of shiny white structures/streaks possible.

Five dermatoscopes: Heine DELTA 20T, and Heine DELTAone (Heine Optotechnik GmbH & Co. KG), DermLite DL4 (3Gen, Inc.), Opticlar (Albert Waeschle Ltd) and Illuco IDS 1100 (Illuco Co. Ltd.) displayed shiny white structures/streaks in polarized mode, with some apparent variations in intensity, distinctly different from the same device in non-polarized mode. The Heine DELTA 30 (Heine Optotechnik GmbH & Co. KG) did not display shiny

white structures/streaks in polarized mode, the images being essentially the same as produced in non-polarized mode (Figures 1 and 2).

Figures 1-2 are labelled to display collages of polarized and non-polarized dermatoscopic images acquired with an iPhone 6 (Figure 1) and a Nikon Coolpix 4500 (Figure 2). No image manipulation has been performed other than cropping.

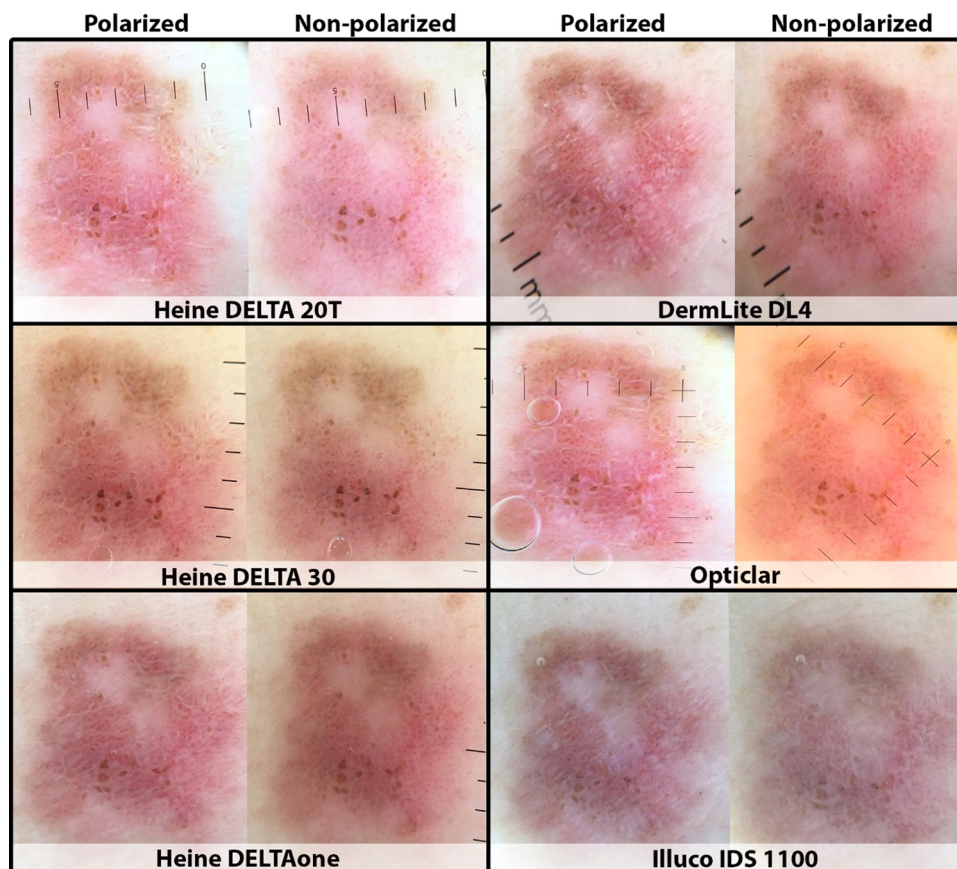
The authors all assert that the features demonstrated with respect to the Heine DELTA 30 are consistent with those observed by each of them in clinical practice.

## Conclusions

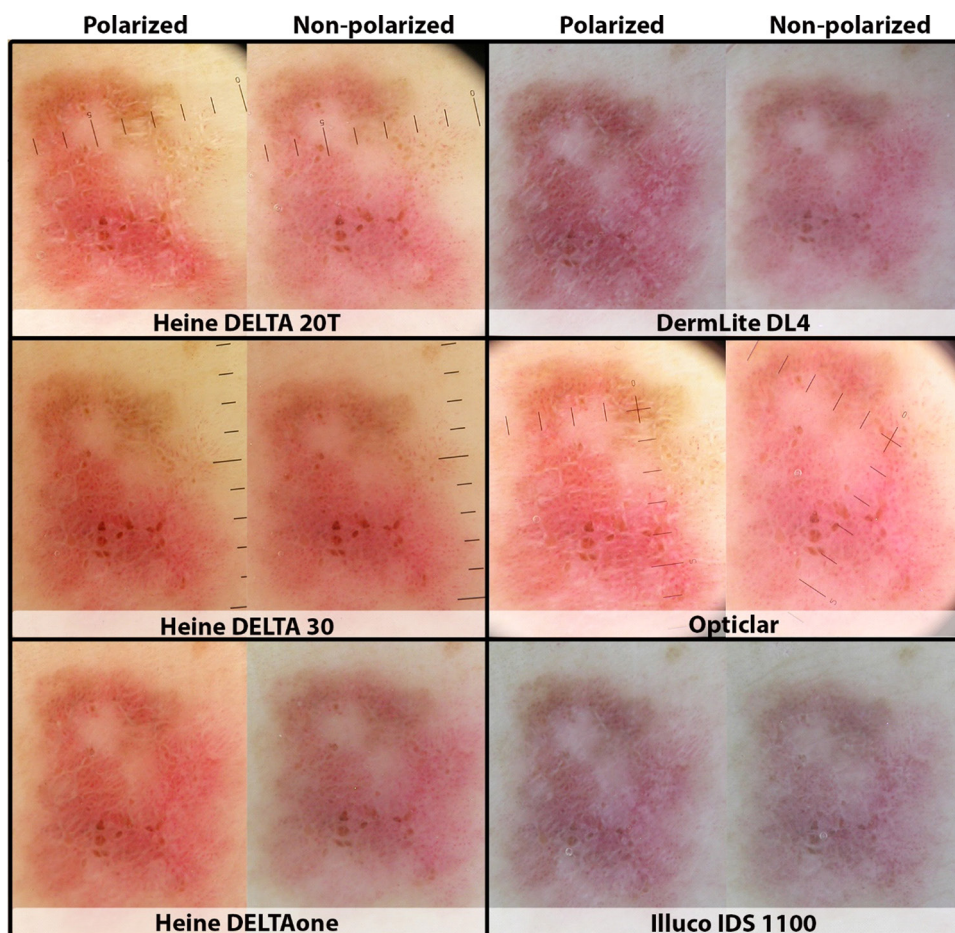
Clinicians are invited to independently test these findings, as it is important for dermatoscopists to be cognizant of the characteristics of the instruments they use due to potential impact on diagnostic performance.

## Acknowledgement

We acknowledge Dr Mohammadreza Rahimpour whose original observations in 2020 initiated this assessment.



**Figure 1.** Polarized and non-polarized images of a superficial spreading melanoma in situ, acquired with 6 different dermatoscopes coupled with an iPhone 6 camera. All photographs were taken by the same photographer (author CW) and are displayed without manipulation other than cropping.



**Figure 2.** Polarized and non-polarized images of a superficial spreading melanoma in situ acquired with 6 different dermatoscopes coupled with a Nikon Coolpix 4500 camera. All photographs were taken by the same photographer (author CW) and are displayed without manipulation other than cropping.

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