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# Skin parameter maps in multispectral dermoscopy

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## Background

Dermoscopy has proven its value in the diagnosis of skin cancer and therefore is well established in daily dermatology practice. Up until now, white light dermoscopy is the standard. Multispectral dermoscopy is based on illumination of the skin with narrowband light sources with different wavelengths. Each of these wavelengths are differently absorbed by skin chromophores, such as pigment or blood (the main chromophores of skin). Multispectral dermoscopy could be a way to enhance the visualization of vasculature and pigment. Blue naevi and angiomas are lesions where distinction between pigment versus blood is not always clear with white light dermoscopy. **Aim** of this study is to illustrate the application of multispectral dermoscopy in the diagnosis of blue naevi.

## Methods

As shown in figure 1, the light absorption by pigment and blood is dependent on the wavelength of the light, resulting in a different 'spectral signature' for each chromophore. By capturing skin images at multiple wavelengths (i.e. multispectral images), the relative concentration of those substances is estimated. These particular images together with the knowledge on skin absorption properties, results in so called 'skin parameter maps'. (1) In this study we illustrate the application of skin parameter maps in the diagnosis of blue naevi.

15 blue naevi, retrieved from a prospectively collected database (Dermscan II) of multispectral and white light dermoscopic images taken with a handheld dermatoscope (Barco Demetra ®), were evaluated. The diagnosis of blue naevus was made either clinically by an expert dermoscopist (10/15 lesions) or by histopathological confirmation (5/15 lesions), marked with an asterisk (*) in table 1.

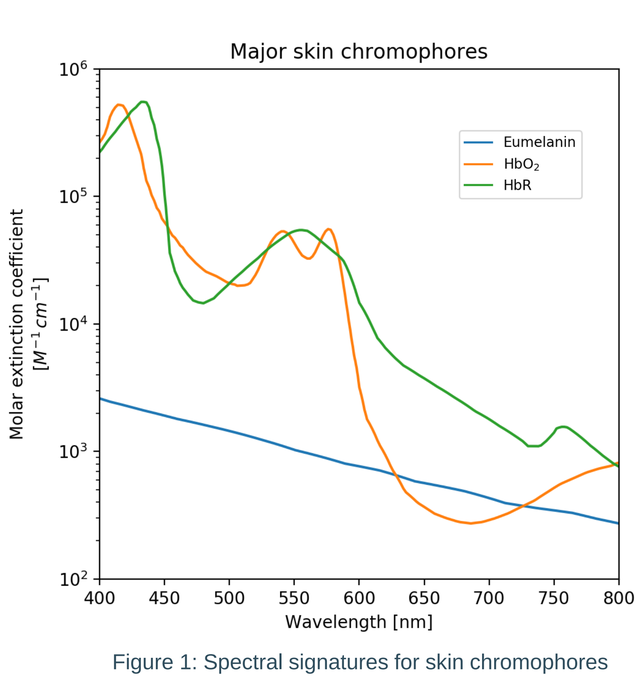


Figure 1: Spectral signatures for skin chromophores

## Results

A **'pigment contrast map',** which shows the relative concentration of primarily pigment and a **'blood contrast map'** which shows the relative concentration of primarily blood were created. The information of these skin parameter maps, in addition to the information from regular white dermoscopy, is illustrated here in two blue naevi and an angioma. In the skin parameter maps of image A, only pigment is highlighted as expected in a blue naevus. In image B the blue naevus is highlighted in the pigment contrast map, whereas a coincidental angioma is highlighted in the blood contrast map. As shown in table 1, in all of the other blue naevi that were analyzed, pigment was observed in the pigment contrast map. In 12/15 blue naevi there was nothing observed in the blood contrast map. In 3/15 blue naevi there was presence of blood highlighted in the blood contrast map, suggesting a vascular component in these naevi.

| Lesion n° | Pigment | Blood | Lesion n° | Pigment | Blood |
|---|---|---|---|---|---|
| 1 | + | - | 9* | + | - |
| 2 | + | + | 10 | + | + |
| 3 | + | - | 11* | + | + |
| 4* | + | - | 12 | + | - |
| 5 | + | - | 13 | + | - |
| 6* | + | - | 14 | + | - |
| 7 | + | - | 15 | + | - |
| 8* | + | - | | | |

Table 1: Visibility of pigment and blood in 15 blue naevi
(*) Histopathologically confirmed blue naevi

## Conclusion

- As illustrated in this poster, application of skin parameter maps could help in the differential diagnosis between a blue naevus and a vascular lesion. Further research needs to clarify the visibility of blood as indicated by the blood contrast map in 3 of the 15 lesions.
- These skin parameter maps should be used complementary to regular dermoscopy with white light.
- A larger study needs to assess the diagnostic performance of the device using standard methods such as sensitivity and specificity of these skin parameter maps.

## Acknowledgments

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*Reference: (1) Janssen L. et al, (in press 2020) Enhanced visualization of blood and pigment in multispectral skin dermoscopy. Skin Research and Technology*

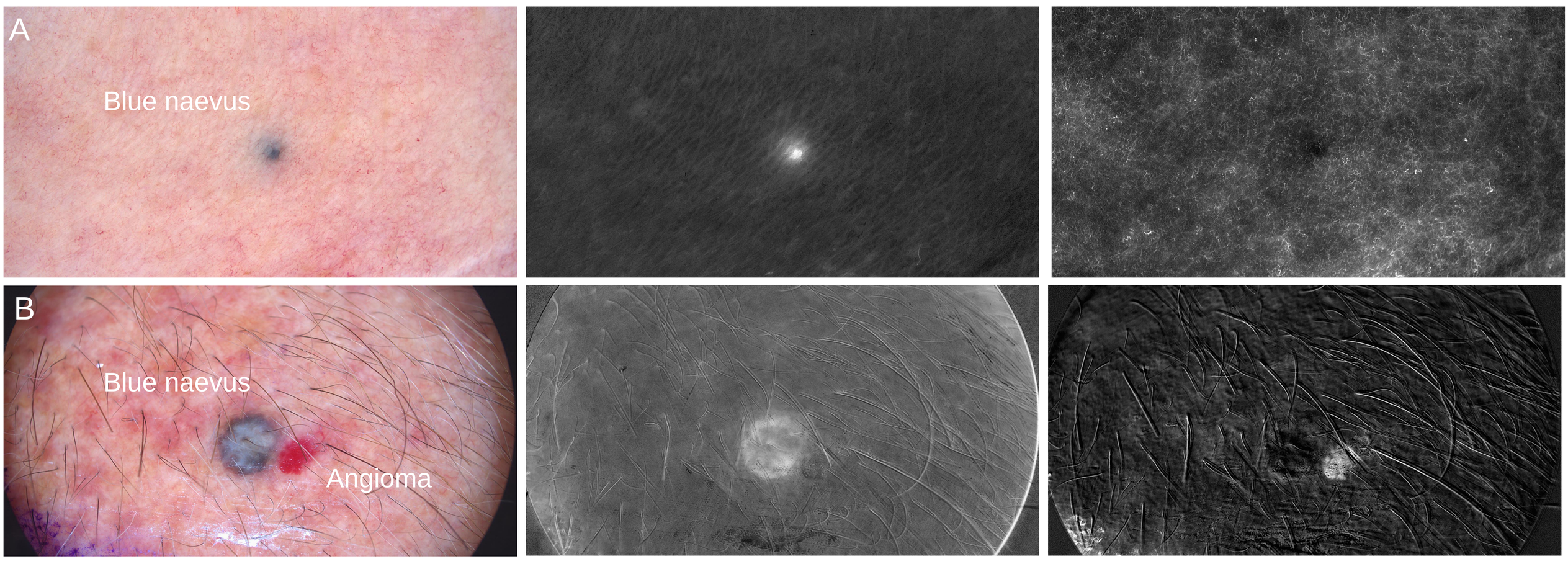


Figure 2: Dermoscopic images: white light (left), pigment contrast map (middle) and blood contrast map (right) of lesion nr. 3 (top) and lesion nr. 4 (bottom).