

The power of polarisation

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With sufficient training and expertise, clinicians can use dermoscopy to improve diagnostic accuracy for melanocytic lesions and other common skin tumours. Dermoscopy may also be applicable in the examination of other elements of the skin including vasculature, hair and nails.

Case presentations

Case 1

A 40-year-old man with a history of significant sun exposure presented with a rapidly growing violaceous nodule on his right lower leg (Figure 1). The history of development was no greater than two months. There was no personal or family history of skin cancer, including melanoma.

Examination demonstrated an ulcerated purplish nodule on the shin with an incidental contact dermatitis outlining

the site of a previous dressing. On non-polarised dermoscopy, the lesion showed multiple colours, superficial ulceration, blue-grey veil and diffuse polymorphic vessels, which were linear-irregular, hair-pin and glomerular (Figure 2). On polarised dermoscopy, multiple shiny bright white linear streaks were also evident throughout the centre of the lesion (Figure 3). The lesion was most suspicious for melanoma.

Diagnosis

A diagnostic excisional biopsy was performed and histopathology confirmed an invasive 2.95 mm level IV nodular melanoma.

Case 2

A 20-year-old woman presented with several small nodules on the right leg. The patient was prompted to seek attention because she was concerned about the possibility of skin cancer. She was unaware of the precise duration of the lesions, which were entirely asymptomatic.

Examination revealed multiple pink-coloured, firm dermal nodules that varied in size from 0.5 to 1 cm. With lateral compression of each lesion, dimpling was observed. Polarised dermoscopy revealed a central white scar-like area containing multiple shiny and broad white streaks orientated perpendicularly to each other (Figure 4). A fine lacy network was seen at the periphery of each lesion.

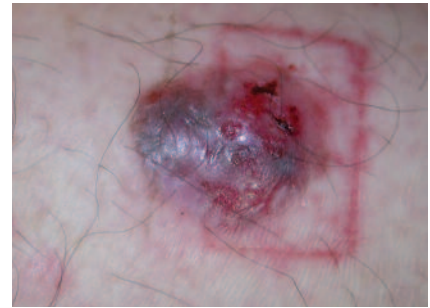


Figure 1. Case 1: violaceous nodule on the right lower leg.

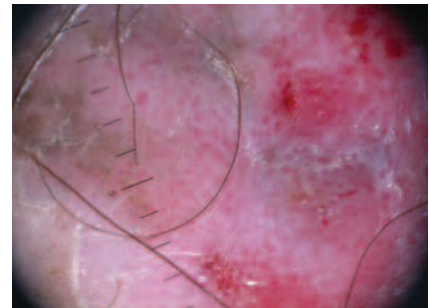


Figure 2. Case 1: nonpolarised dermoscopy of the leg nodule demonstrating ulceration, multiple colours and a polymorphic vascular pattern (scale is in millimetres).

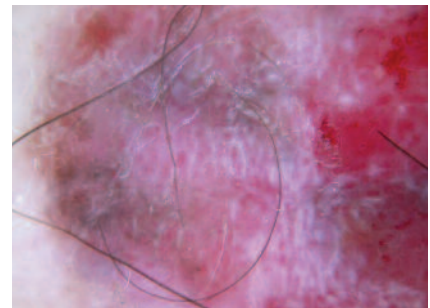


Figure 3. Case 1: polarised dermoscopy of the leg nodule, showing multiple shiny, white streaks (chrysalis structures).

Diagnosis

The clinical diagnosis was multiple dermatofibromas.

Case 3

A 42-year-old man presented with a persistently erythematous, hyperkeratotic plaque on the left shin (Figure 5), which

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Figure 4. Case 2: polarised dermoscopy of a small nodule on the leg demonstrating a central white scar-like area with surrounding white streaks (chrysalis structures) and a fine marginal pigment network.



Figure 5. Case 3: scaly erythematous plaque on the left shin (blackened biopsy site visible at 7 o'clock).

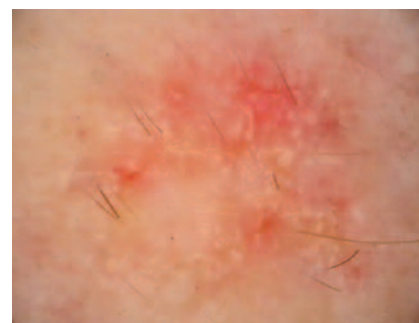


Figure 6. Case 3: polarised dermoscopy of the plaque on the shin showing multiple shiny white streaks (chrysalis structures) on a pink amorphous background.

had not responded to treatment with potent topical corticosteroids and antifungals. The patient had fair skin, moderate solar damage and a significant history of recreational solar exposure as a volunteer surf lifesaver.

On examination, the lesion was lightly hyperkeratotic and erythematous. On polarised dermoscopy, there were multiple bright white, linear streaks (Figure 6). No specific vascular features were seen.

Diagnosis

A diagnostic 3 mm punch biopsy was performed and histopathology confirmed a superficial basal cell carcinoma (BCC).

Discussion

Each of these cases illustrates a recently described dermoscopic feature known as 'chrysalis structures'. These represent the shiny, bright white, orthogonal linear streaks commonly seen in dermatofibromas and scars, but also seen in BCCs, Spitz naevi and melanomas (with regression), under polarised dermoscopy.¹

Historically, the first generation of handheld dermoscopes have been nonpolarised and, as a result, most textbook literature on the subject is based on purely nonpolarised dermoscopic images. The introduction of polarised dermoscopes (e.g. 3Gen DermLite range

and Derma Medical's videodermoscope Molemax), which use the properties of cross-polarised light, has enabled the visualisation of subsurface components of the skin without a liquid interface or direct contact with the dermoscope. Polarised dermoscopy allows a greater appreciation of deeper structures such as collagen by eliminating the glare from the superficial layers of the skin, as well as improved ability to appreciate vascular structures.²

Chrysalis structures are exclusively seen with polarised dermoscopy and it has been postulated that these structures represent dermal fibrosis or at least remodelled collagen in the setting of tumours. The presence of chrysalis structures in dermatofibromas have been shown to be of diagnostic significance.³

Dynamic polarised dermoscopy, where the clinician rotates the dermoscope while fixing his or her gaze, can validate the presence of chrysalis structures by making these appear more or less prominent depending on the angle of polarisation. This is known as the 'angular dependence of polarised light'.¹

In our experience, the presence of chrysalis structures is another dermoscopic feature that allows the rapid identification of BCCs – possibly more so than the vascular pattern of arborising

telangiectasia, which can be variable. It is also a useful diagnostic feature for melanoma, although to date there are no studies to illustrate its true diagnostic sensitivity and specificity.

Key points

- Chrysalis structures aid in the diagnosis of both BCCs and melanoma, although the specificity and sensitivity of the finding remains to be fully elucidated.
- The complementary nature of polarised and nonpolarised dermoscopy suggests that the use of both instruments for assessment of possible skin tumours is ideal.

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References

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COMPETING INTERESTS: None.