

Digital dermatoscopy is a handy alternative in melanoma referrals

Digital dermatoscopy is a fast-moving area of technology. Dermatologist **Amanda Oakley** reviews its uses and some of the range of smartphone and camera compatible devices and adaptors, as well as stand-alone cameras



The first dermatoscopic camera in use at Waikato Hospital's department of dermatology was a purpose-built, unpolarised Minolta SLR Dermaphot. It was necessary for us to scan photographic transparency slides to use them digitally. The Dermaphot was stolen in 2003; since then, we have used, and continue to use, a variety of photographic systems.

My iPhone 6+ is very convenient. You may have valid reasons to prefer your Android or Microsoft mobile device. Or, maybe, you would consider an iPhone Touch, a convenient clinical image repository that is cheaper than a phone and has built-in security and automated back-up using iOS8+.

This third article on taking clinical images using a smartphone looks at digital dermatoscopy. Reasons to take dermatoscopic images may include:

- clinical record
- second opinion
- clinicopathological correlation
- teledermatology opinion
- referral
- teaching and research.

High Suspicion of Cancer (melanoma) referral now requires digital images. Although dermatoscopic images are currently optional, checking the box "Dermatoscopy of skin lesion is suspicious for melanoma" is an alternative to finding three or more red flags from the ABCDE criteria, personal history of melanoma and strong family history. A convenient smartphone referral app makes it easy to attach images taken on the same device.

Dermatoscopic imaging requires:

- patient consent
- identification of the patient, location, date
- a skin lesion of interest or concern
- a compatible camera, adapter and contact dermatoscope
- immersion gel or fluid
- an image showing the anatomic location of the lesion
- a macroscopic or close-up image with a scale to show lesion size
- polarised and unpolarised dermatoscopic images
- storage and transfer software.

Buyer's guide to digital dermatoscopy

Caveat: The following description of currently available dermatoscopic imaging solutions is likely to quickly become outdated.

The first three iOS-compatible devices listed here are dedicated to digital dermatoscopy.

VEOS DS3 is an integrated mobile dermatoscope that can be purchased online from Canfield Scientific^a – features include:

- a 32GB iPod Touch with 5MP camera
- polarised and non-polarised lighting
- ×10 magnification
- Easy-to-rotate dermatoscope lens to take macro and anatomic views
- VEOS app with web-archiving options.

The FotoFinder Handyscope^b slides onto your smart device, and slides off for anatomic and macro views. Choose one for the iPod Touch, or expect to buy a new Handyscope when you upgrade your phone – features include:

- models for the iPhone 5, 6+ and iPod Touch
- polarised and non-polarised lighting
- non-contact and contact options
- ×20 magnification
- Handyscope 2 app with FotoFinder Hub web storage.

MetaOptima Technology's MoleScope^c is a low-cost device promoted for patient use – features include:

- models for the iPhone 5, 5c, 5S, 6, 6+ (Android coming soon)
- non-polarised lighting only
- ×10 magnification

DERMATOLOGY QUIZ ANSWERS

1. Scan of a transparency slide taken using a Dermaphot camera. It shows plugged hair follicles and a lack of hair in follicular mucinosis.

2. Acral naevus without parallel pattern morphology. Symmetry of structure indicates it is benign. Image taken using a FotoFinder Handyscope and an iPhone 4 (provided by Mr Richard Martin).

3. Collision naevus taken with a MoleScope and iPhone 6+.

4. Melanoma, taken with a MoleScope and iPhone 6+.

5. Basal cell carcinoma, taken with a MoleScope and iPhone 6+.

6. Seborrhoeic keratosis, taken with a DermLite DL1 and iPhone 4.

7. Scabies burrows and mites, taken with a DermLite II Pro HR and iPhone 4.

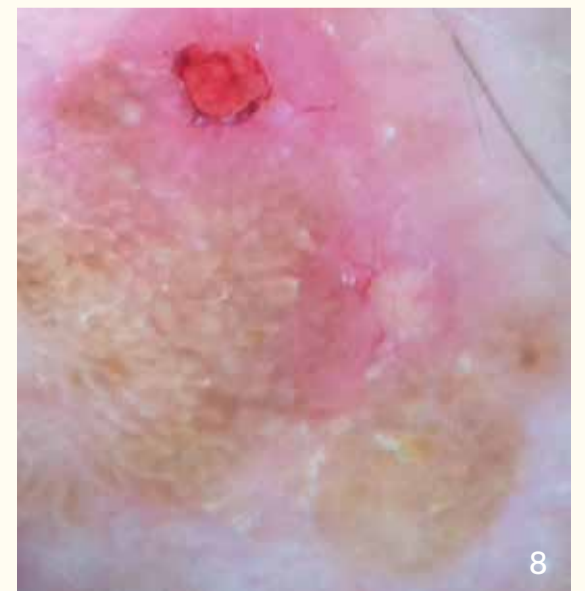
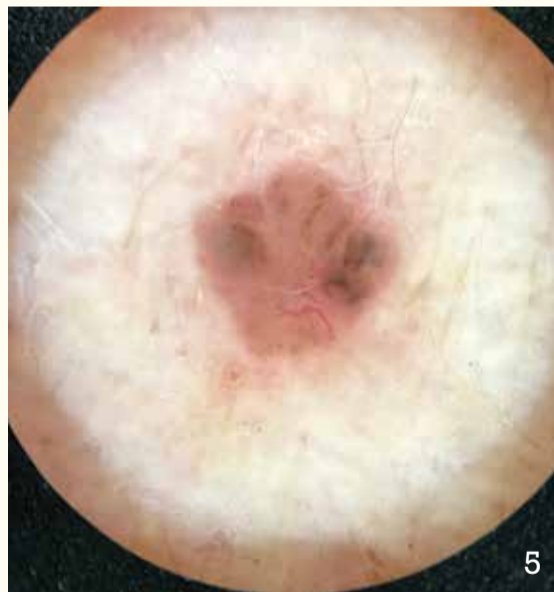
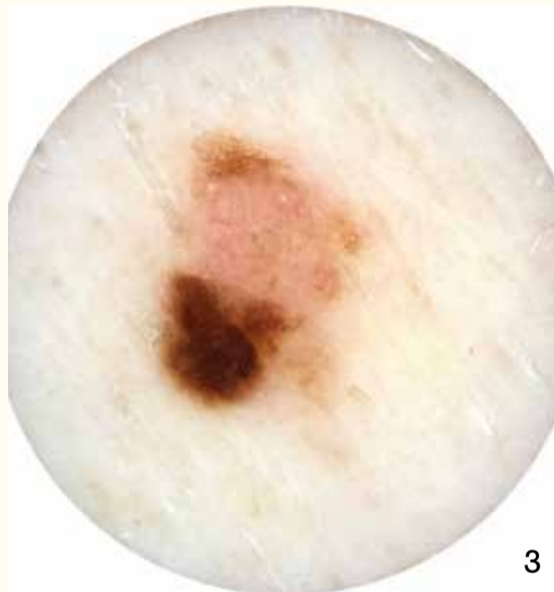
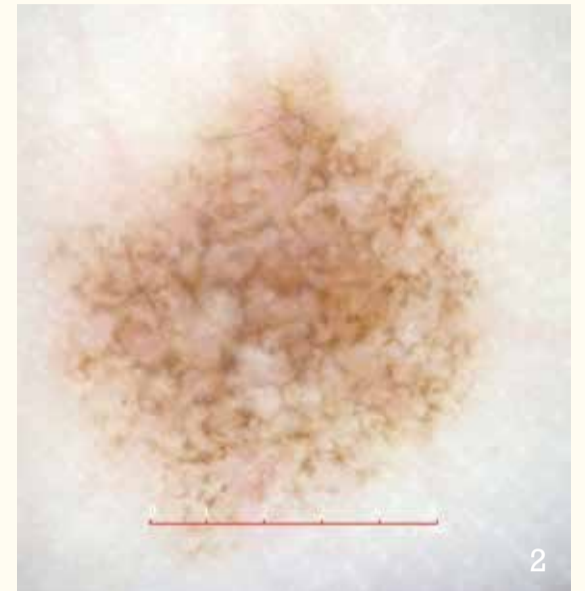
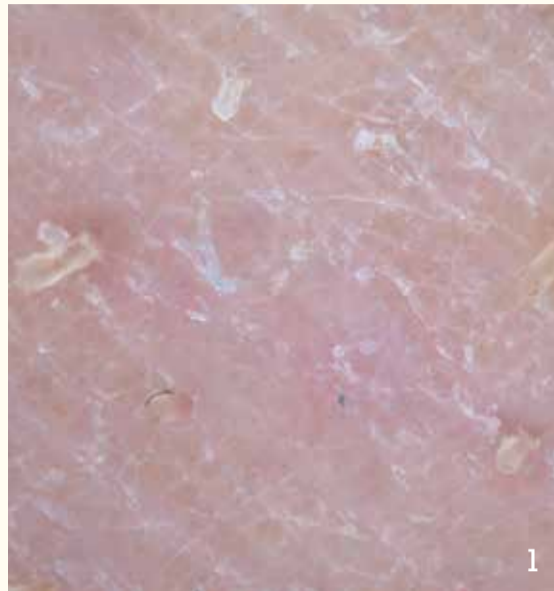
8. Collision of seborrhoeic keratosis and basal cell carcinoma, taken with a DermLite and iPhone 4.

9. Metastatic melanoma, taken using an iPhone 5 (provided by Dr Michael Koch).

10. Two adjacent melanomas, taken using a DermLite Cam.

11. Melanoma, taken using a DermLite Cam.

12. Lichen planus, taken using a Foto II Pro Plus with Nikon D7000.





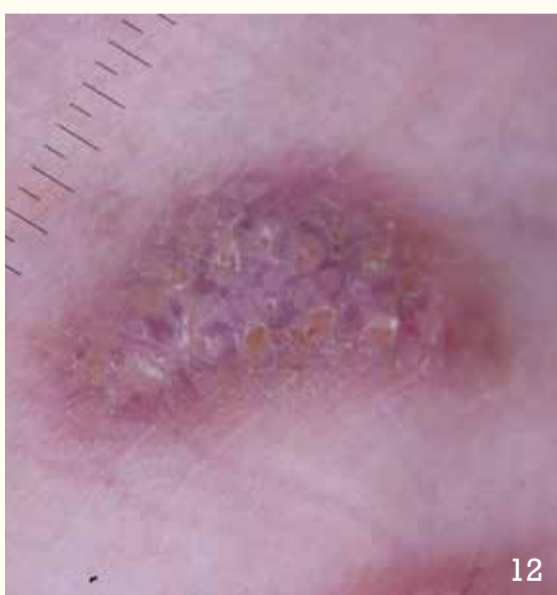
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High Suspicion of Cancer (melanoma) referral now requires digital images. Dermoscopic images are currently optional

Canfield Scientific^a offers VEOS HD2 – features include:

- adapters for the iPhone 4, 4S, 5, 5S, 6, 6+; iPad 2, 3, 4, Air
- polarised and non-polarised lighting
- non-contact and contact options
- ×10 magnification
- VEOS app with web-archiving options.

With additional heads, an Opticlar^e D-Scope can also be used as an otoscope and an ophthalmoscope – features include:

- adapters for the iPhone 4, 5, 6, 6+
- several accessories, which make it very flexible
- polarised and non-polarised lighting
- non-contact and contact options
- ×10 magnification
- no software.

Digital dermatoscopy does not always require a smartphone. You could purchase a standalone dermatoscopic camera and store your images (at least temporarily) on an SD card.

The Canfield Scientific^a VEOSSLR is an integrated macroscopic and dermatoscopic, flash-based 18MP Canon EOS camera – features include:

- polarised and non-polarised lighting
- contact and non-contact options
- training offered at a price
- ability to add Mirror software.

The DermLite^d DL Cam is an integrated 5MP dermatoscopic camera designed by MoleMap NZ. Another camera

Finding digital dermatoscopy systems online

► **a.** Canfield Scientific <http://bit.ly/1PCOh2Y>

► **b.** FotoFinder Handyscope <http://bit.ly/1U2vGOW>

► **c.** MetaOptima MoleScope <http://bit.ly/1NIRfSm>

► **d.** DermLite <http://dermlite.com/> and <http://bit.ly/1UWrWY>

► **e.** Opticlar from AWOnline www.aw-online.com

► **f.** Heine <http://bit.ly/1J95o7Y>

is needed for anatomic shots. Features include:

- polarised and non-polarised lighting
- contact-only use, and not easy to use in small or curved body sites
- ×10 magnification
- ability to add MoleMap's MoleTrac software.

You may already own a Canon or Nikon digital SLR camera to which you can attach a specific DermLite^d dermatoscopic FOTO II Pro or II Pro Plus lens.

Adapters are available for Canon, Nikon and Olympus SLR cameras for Heine^f Delta 20 dermatoscopes, and for Canon/Nikon SLR cameras for the Opticlar^e D-Scope.

Adapters are available for several handheld dermatoscopes to be used with a compact camera – these include:

- DermLite^d FOTO + Canon PowerShot G16 package^d
- DermLite^d DL3N, DL3, II Hybrid m, II PRO HR, II Multispectral, II Pro for Nikon 1, Canon 10/11/12/15/16 and Sony Cybershot 20MP DSC-W800

- Opticlar^e D-Scope for Sony Cybershot and others
 - Canfield Scientific^a VEOS HD2 for Nikon 1.
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- DrMoleScope app and web storage.

The hand-held dermatoscopes described below can be attached to a smartphone using an adapter.

DermLite^d photodermoscopy professional models are Foto, DL4, DL3N, DL3, II Hybrid m, II PRO HR, II Multispectral, II Pro and DL1. Low-cost devices for patients are DL1 basic and DermLite Monitor. Features include:

- connection kits for the iPhone 4, 4S, 5, 5S, 5C, 6, 6+; iPad 2, 3, 4, Air, mini; Galaxy S3, S4, S5, S6
- polarised and non-polarised lighting
- non-contact and contact options
- ×10 magnification
- DermLite licenses the FotoFinder app.