







Clinical imaging with an iPhone

Hon A/Prof Amanda Oakley Waikato Hospital, 25 June 2015



This presentation

- Why take clinical images?
- Patient consent
- Smartphone cameras
- Best practice
- Anatomic views
- Close-up photography
- Dermatoscopy
- Some helpful apps

Why take clinical images?

- Documentation
- Compare clinical status at follow-up
- Referral to dermatologist
- Histopathology request
- Multidisciplinary review
- Personal education
- Teaching
- Publication

Documentation



Samsung Galaxy S4, September 2014

Follow-up



drmolescope.com

Referral to dermatologist

The old way



The new way

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Histopathology request



Multidisciplinary meeting



Personal education

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Teaching



Publication





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Exercise-Induced vasculitis

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Patient consent

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Consent on iPhone

PicSafe Medi



Consent



Smartphone cameras

- Always with you
- High quality in top end models
- Sensors work in low light
- Easy to archive / back up
- Easy to email / message / upload to website

iPhone 6 or iPhone 6+



iPhone 6+ or iPhone Touch

8 MP iSight camera 5.5" 1920-by-1080-pixel resolution at 401 ppi



5 MP iSight camera 4" 1920-by-1080-pixel resolution at 401 ppi



Samsung Galaxy 6





- 16 MP
- Works well in low light
- HDR removes shadows and highlights
- 5.1" display



Other Androids





- HTC One M9 20 MP
- Sony Xperia Z3 20.7MB

Best practice

- Privacy + security
- Back up
- Removing image from the phone
- Quality images

Privacy

- Check privacy settings
- Avoid full-face images where possible
- Remove jewellery and clothing
- Tattoos are identifying

Security

- Lock your screen
- TouchID is best
- Use 8⁺-character memorable passcodes eg il2tlk2U!



Automatic encrypted backup

- iCloud Drive
 - Or, via iTunes when connected
- My Photo Stream
- Dropbox



Sharing the picture



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Image quality

- Ensure plenty of light
- Check exposure is adequate
- Suitable background
- Avoid extraneous objects
- Ensure focus
- Lens parallel with subject

Under-exposed

- Avoid side lighting
- Use flash if necessary (force flash)



Apple iPhone 3GS, August 2011

Shadows rarely help diagnosis







Apple iPhone 3GS, August 2011

Tap & drag to adjust exposure



Use a plain matte background

- Neutral blue, green, grey
- Cloth, paper, wall, photographic backdrop





Avoid a busy background





HTC_PO582, April 2015

HTC_PO582, April 2015

Avoid extraneous objects



Avoid extraneous objects



Ensure focus

- Lens parallel with subject
- Don't get too close
- Tap screen to guide the camera to focus point



Nokia N95, November 2008

Lens not parallel with subject



Samsung Galaxy S4, January 2015

Sony Ericsson K800i, April 2009

Anatomic views

Photography Guide for Teledermatology


Head and neck













Minimising shadows



Use a reflector to get rid of shadow



Trunk



Trunk





Arms









Hands



Nails



Legs



Legs





Legs

Good



Bad



Feet





Close-up photography

- With and without a ruler where relevant
- If too close, back off and zoom to improve depth of field
- Hold camera still or use tripod



Close-ups of curved areas

- Nose, ears, lips
- Use a neutral-coloured card with a hole in it if your camera is struggling to focus or exposure is wrong





Close-up tips

Auto exposure/focus lock



Flash on



Camera+







To keep camera still



Timer



Skin lesion of concern

- Anatomic view
- Macro view
- Macro view with rule
- Dermatoscopic view



Locate the lesion precisely

- Anatomymapper.com
- Documentation
- Histopathology requests





Naevus

ID label



Remove hair



Dermatoscopic views

- Smartphone adapters for several devices
 - DermLite DL1, DL1 Basic,
 DL3, DLII HR Pro, DLII
 Hybrid
 - Opticlar
 - VEOS
 - Handyscope





Dermatoscopic images

- Contact with skin
- Polarised and/or nonpolarised views
- Apply fluid eg sanitiser



Why have a dermatoscopic camera?

- Referral to specialist
 - Dermatology
 - Teledermatology
 - Histopathology
- For follow-up
- It's fun!



Two iPhone cameras for the non-dermoscopist or patient

MoleScope

DermLite Monitor





MoleScope





MoleScope device



MoleScope iPhone app

Register patient

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Chose body site



Take the pictures

Overview image

Dermoscopy image



Annotate

On device



Online



Evaluate the lesion



Dr. Amanda Oakley made the following diagnosis: Normal with the following note: Benign naevus stable @6/21/2015, 10:33:03 AM



DrMoleScope.com



Automatic rotation for follow-up



Dermlite Monitor

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Referral to dermatology at WH

- Electronic referrals permit attachments
- However, currently:
 - Images often printed in B&W or over 2 pages
 - Providing advice is time consuming; it's easier to arrange an appointment
- In the future, we'll assess referrals online, which will help in triage and in advice

Teledermatology referral

- New Zealand Teledermatology provides an online advice service for GPs

 Drs Oakley, Rademaker, Yung, Hill
- It is currently free to Waikato GPs
 - We charge organisations in other parts of NZ
www.teledermatology.nz



CollegiumTelemedicus.org

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Acknowledgements

- Grateful thanks to David Oakley
- iPhone support
- Anatomymapper.com
- Camera+
- PicSafeMedi
- DrMoleScope
- Dermlite

