



Dermatological photography

Amanda Oakley

Dept of Dermatology, Health Waikato

Webmaster, DermNet NZ (NZ Dermatological Society)

Clinical Associate Professor, Waikato Clinical School

Specialist Dermatologist, Tristram Clinic

Diagnosing Dermatologist, MoleMap NZ

Who should attend this lecture:

- Non-photographers wanting to:
 - Archive images for patient record
 - Obtain 'before' and 'after' images
 - Obtain dermatological opinion
 - Send image with specimen for histopathology
 - Obtain clinical images for teaching
 - Send me good photos to add to DermNetNZ.org

This presentation

- Cameras
- Camera settings
- Backgrounds
- Preparing the subject
- Anatomic, macro and dermoscopy views
- Lighting
- How to focus
- Patient consent
- Editing
- Archiving
- Sharing

Informed consent

- Get documented permission for photographs i.e. written or at least verbal consent for:
 - Clinical purposes
 - For the record
 - To compare at a later date
 - Emailing for consultation
 - Publication
 - Use on the Internet
 - Etc.

Informed consent

Waikato District Health Board Photographic Consent Form
Visual Communications
Patient consent for clinical imaging must be completed prior to this request being actioned.
Email: photo@waikato.govt.nz Phone: 075 853 4790

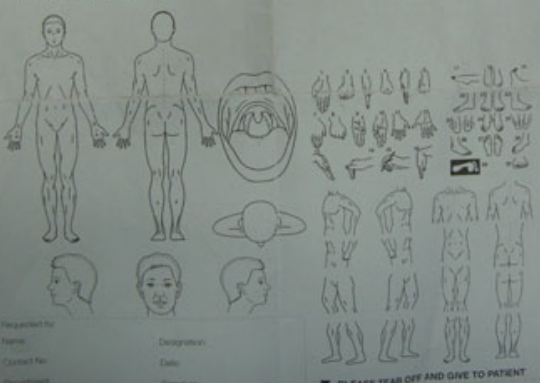
Use For:
☐ Clinical Record
☐ Education
☐ Publication/Promotional
☐ Research
☐ Other

Video format required:
☐ J28 Video Tape
☐ PowerPoint Quality Slides
☐ Other

Photography Format Required:
☐ CD ☐ PowerPoint ☐ Print by Name ☐ Camera card inserted
☐ Email
☐ Extra copies to: _____
 Clinical images taken via non-secure staff are required to be submitted to the central WaikatoDHB digital repository
 Archived: YES NO (Please refer to Clinical Images Policy)

DIAGNOSIS: Please Print Clearly _____

DETAILS / VIEWS REQUIRED:



Requested for: Name _____ Designation _____
 Contact No. _____ Date _____
 Department _____ Signature _____

PLEASE TEAR OFF AND GIVE TO PATIENT

Visual Communications

Clinical Photography and Video Recording
 Clinical imaging can play an important role in a patient's treatment as well as the education of medical and other clinical staff. You have consented to have photographs or video taken either for your clinical record, education, publication or promotional purposes. These clinical images will be safely stored in our digital archive.

Viscom Use Only:

File No. _____ Patient Label
 Date Taken _____ Name _____ DOB _____
 Photographer _____ Address _____

Consent to Clinical Photography and Video Recording
 Clinical imaging can play an important role in a patient's treatment as well as the education of medical and other clinical staff.
 In this regard there are four reasons for which you might be requested to agree to recording of personal clinical images.

Purpose A: Clinical Record Only
 The clinical images/video requested are for the purpose of your clinical assessment and evaluation and will form part of your confidential clinical record.

Purpose B: Educational
 The images/video recording requested may be of benefit in your treatment but also may be used for ongoing medical education and training.

Purpose C: Publication/Promotional
 The images/video recording requested may be used for medical teaching including publication in a journal or textbook, a display or information leaflet, or to be on a website and as such may be seen by members of the general public.

Purpose D: Research
 The images/video recording requested may be used for research purposes including publication in a journal or textbook.

Consent Form
 I, _____ of _____
 (Name) (Address)
 have had these reasons explained to me and give the Waikato District Health Board my consent for my clinical images to be used for the following purposes:
 (Please tick)
☐ A- Clinical ☐ B- Education ☐ C- Publication/Promotional ☐ D- Research

Signature _____ Date _____ / ____ / ____

Name if other than Patient _____

Patient/Guardian _____
 To be filed in the Patients Clinical Record

PLEASE TEAR OFF AND GIVE TO PATIENT

To access a copy of your clinical image
 Your images will be safely stored in Waikato District Health Board's Clinical Image Digital Repository.
 To obtain your image please contact Visual Communications, Waikato District Health Board, Private Bag 3220, Hamilton.
 Phone 07 553 8100 or email photo@waikato.govt.nz

Photographic Consent Form

I, _____, permit Dr Amanda Oakley / Tristram Clinic to obtain photographs of myself / _____ for educational, medical, scientific or research purposes.

Unless the specific purpose is deleted below, I agree that the photographs and information relating to my case may be published or used for:

- Clinical purposes
- Lectures
- Professional journals
- Internet World Wide Web Pages

I shall not be identified by name in any such publication or use.

I understand that in some cases my facial features may be visible and/or recognizable.

Photographs shall remain the property of Dr Oakley / Tristram Clinic.

I hereby release Dr Oakley / Tristram Clinic and any other persons participating in my care or dealing with the photographs from any and all liability which may or could arise from the taking or use of such photographs.

 Signature of Patient / Parent / Guardian *

_____/____/____ Date

 Patient ID number

 Working Diagnosis

*If the patient is a minor or is unable to consent in writing for any reason, consent must be obtained on the patient's behalf by a parent or legal guardian.

THE CAMERA



Choosing a camera



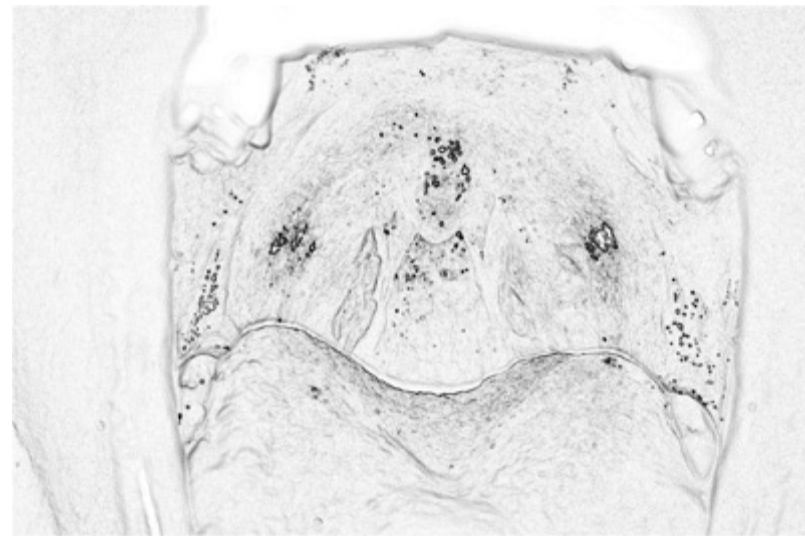
- SLR – better pix but heavier & complex
- Digicam – inexpensive, small, adequate
- Cell phone – in your pocket, easy to email



iPhone is brilliant



Tonsillitis



Essentials

- 5MP+
- Macro capability
- High quality lens
- Large LCD screen
- Large capacity memory card



Nice extras



- Optical zoom (not digital zoom)
- Stabilised lens (anti-shake)
- User-adjustable settings
- Ability to screw on attachments to lens
- Rechargeable battery



Memory card (flash)



- Any will do:
 - Secure digital card SD (faster)
 - Fuji/Olympus XD picture card
 - Sony memory stick MS
 - CompactFlash CF type I & II
 - Multimedia card MMC
 - SmartMedia SM (fragile)
 - IBM Microdrive MD
 - CD-R or -RW, mini CD-R (slow to write)

COMPOSITION

Background



Choose a background

- Plain matte colour fabric or card or wall
- Washable, disposable, or not touching the patient
- Grey, green, blue best
 - White results in underexposure of subject
 - Black may result in overexposure of subject
 - Pink provides insufficient contrast with human skin

Backgrounds: good – plain



Out of focus carpet

Backgrounds: bad – messy



Cluttered - sets the scene?



White: incorrect colour, folded

Preparing the subject

- Remove jewellery, unnecessary clothing or identifying items
- Dorsum feet: stand on stool, cover with same colour material as background
- Soles: kneel down
- Face: sit on stool
- Baby in care giver's arms
- Only photograph breasts and genitals when they are the main subject, and then only as close-ups

Arranging the patient

- Plain matte background - neutral grey, surgical green, mid-blue, black, white
- Place subject well in front of this background to reduce shadow
- Plenty of even light - avoid the window, tungsten better colours than fluorescent
- Remove distracting objects
- Stabilise the camera - tripod, monopod

Prepare patient: good



Comfortable



Positioned well

Prepare patient: bad



Mat is too small

identifying



Unnecessarily revealing



Pink background, legs apart

Composition: bad



Stabilise the camera



Monopod



Tripod



Minipod



Bean bag

Internal flash

- Flash is usually required for digicam indoors
- Ring light preferable for macro, but expensive
- Use zoom to increase distance from subject (check distortion at image edge)
- Red-eye reduction sometimes necessary but double flash can result in the patient moving
- Ensure plenty of external lighting to reduce glare and improve overall exposure
- Slave flash / umbrella inexpensive but unpredictable

Extra lighting

Slave + umbrella



Ring light



Flash diffuser



Ring flash

Reflected light

Portrait images

- Macro setting may be necessary - check minimal focus distance of your camera
- Focus on the eyes, or the skin lesion of interest
- Use the zoom to frame the subject but check that this doesn't cause distortion
- Camera should be parallel to the subject or slightly above it

Positioning

Feet - kneel

Legs - on low bed

Scalp - bend forward



Macro images

- The subject and camera must not move
- Use tripod, monopod, minipod
- 2s self-timer or remote shutter button
- Use zoom &/or macro setting
- Check minimum focus distance
- Camera parallel to the skin lesion

Anatomic view

- Reveal location
- Distribution of rash
- There may be no need for any other views



Angle of view

- Lens parallel to subject
- Easy to distort its shape



Angle of view

- Perpendicular view emphasises elevation
- Close-ups have narrow depth of field



Macro or close-up view



Lighting

- Use as much as possible
- Try to avoid side lighting from window
- Take pictures with and without flash
- Use auto setting as well as program setting
- Manual white balance if auto setting gives wrong colours

Flash or no flash

Shadow



Flash or no flash



Reflection



Side lighting

Flash or no flash



Shadows

Flash or no flash



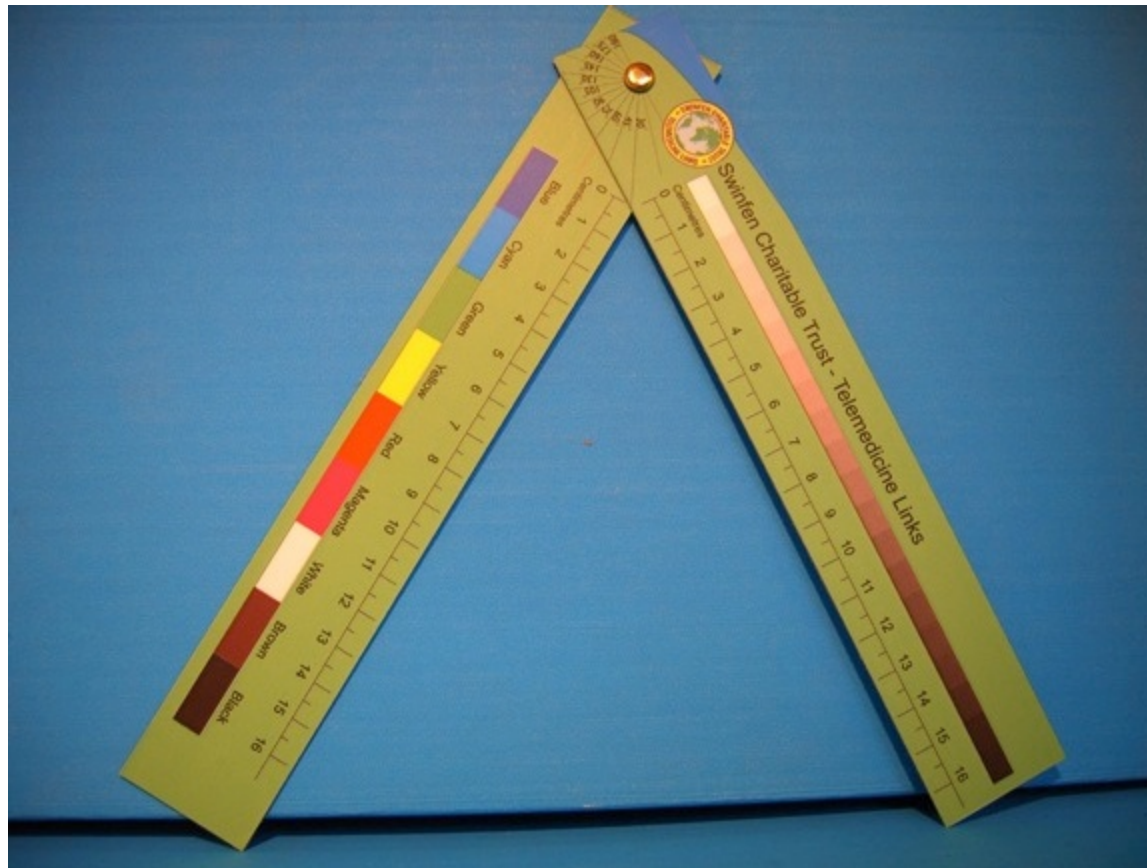
Macro with flash

- Minimum distance for flash means you may not be able to use it for macro
- Diffuse the flash with filter i.e. tape over it
- Try reflecting flash back to a slave light
- The bright light of the slave may need to be dispersed e.g. with paper in front of it, or reduce the light entering the camera by using neutral density filters

Macro without flash

- Provide plenty of light using a ring light, or top & side lighting with reflectors (white card)
- If depth of field is too small, increase ISO or select larger f-number on aperture priority
- Try out different metering systems (centre-weighted is usually best)

Standard colours



Increase incident light: reflection



Add a light source

Slave + umbrella



Ring light



Flash diffuser



Ring flash

How to focus

- Auto focus may not work on skin surfaces
- Manual focus is tricky or unavailable
- Options:
 - focus on a line: underwear, label, another item that is then removed

Focus

- Autofocus is best most of the time but it increases the time to take the picture
- Manual focus useful for close-up shots in curved places e.g. inner canthus or when autofocus can't fix e.g. plain white skin
- Half depress shutter to shift focus point away from the centre

Good focus



Poor focus



Tricks for focus



DERMOSCOPIC IMAGES

Dermoscopy images

Requires:

- Dermatoscope
- Adapter
 - For your specific camera

Dermoscopy images

- Dermlite Foto
- Adapters for Dermlite, Dermogenius, Dermatoscope, Episcopes
- Hand-held efforts



Dermoscopic photography



DIGITAL CAMERA USE



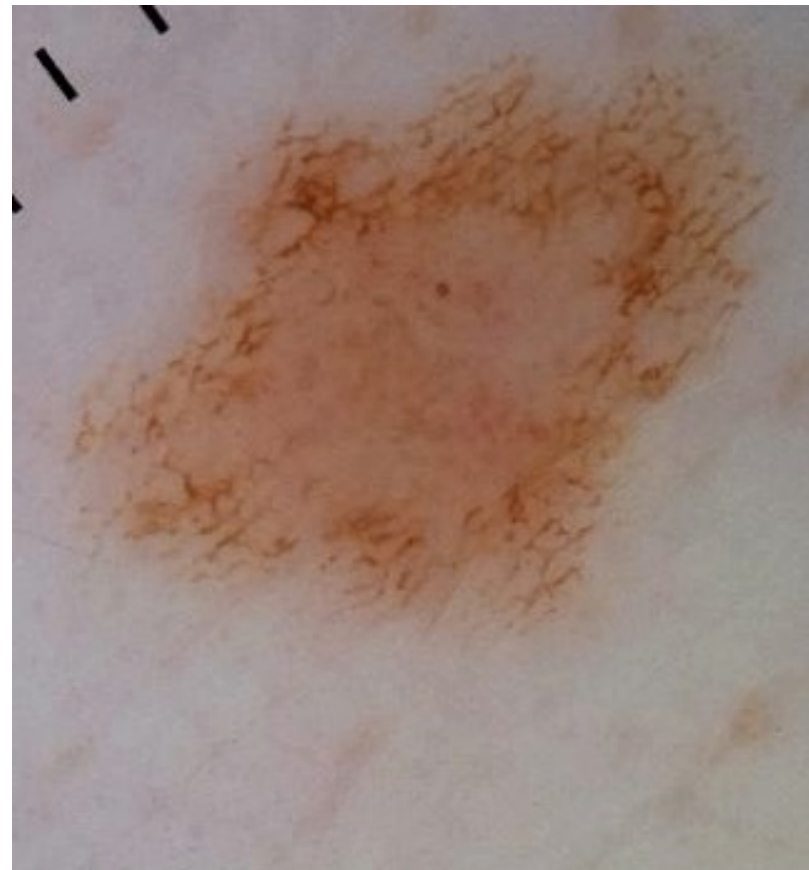
CAMCORDER USE



Dermlite photography



My favourite camera



Dedicated dermoscopic cameras



Handyscope® Fotofinder
iPhone 4 camera

Canfield
Dermoscope™



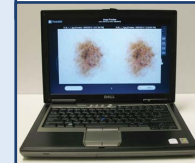
Dino-lite digital Dermascope
USB camera

Hand Held Dermatoscope with Image Capture



Polarised Light
for No-Oil Imaging

PC Transfer
via USB



DermaFOTO

- > Hand held device for live imaging/capture of All Skin conditions
- > Quick examination with no immersion fluids required
- > Easy to use device with quick capture of micro or macro image
- > Review 50 up to 100 captured images on the DermaFOTO screen
- > Tailored image capture with variable zoom and light source
- > Portable, lightweight unit with rechargeable battery pack
- > Download Directly to your PC for diagnosis, storage & follow up

	Special Show Price	Qty	Total Price
DermaFOTO unit + Free Software	\$1,500.00		
		Delivery	
		GST	
		Total Amount Due	

GPCE SPECIAL ORDER FORM

Business Name: _____

Contact Name: _____

Address: _____

Suburb: _____

State: _____ Postcode: _____ Country: () AU () NZ

Phone: _____ Fax: _____

Email: _____

Payment Via Credit Card (3% surcharge on AMEX and Diners Card Payments):

Credit Card # _____ Expiry Date: _____ CCV: _____

Name on Card: _____ Signature: _____

MoleMap / 3 Gen



DLcam

- Lesion imaging: macro / dermoscopy
- Incorporated in MedTech
- Software for short-term monitoring
- Software to get second opinion
- Wireless option

Dermoscopic view



Dermatoscopy: exposure



Dermatoscopy focus

- Remove scale from lesion with oil/alcohol
- Clean lens carefully
- Focus on white writing on a red card
- Half-depress shutter
- Shift device to lesion
- Fully depress shutter



EDITING

Editing the photo

- Save original file with another name
- Crop to remove unnecessary data
- Adjust brightness and contrast
- Rarely, adjust colour balance
- Reduce image size for emailing or website
- Optimise to maintain best quality

Editing a photo

4000x3000 px
3.2 MB



Adjust
brightness



Crop



Reduce
file size
& optimise



640x480 px, 44 KB

De-identifying

- Close-up shots
- ?Cover eyes later
- ?Pixellate eyes later

De-identifying

✓



Lens distortion

- Occurs because of short focal length (due to small size of digicam sensor)
- Barrel distortion for wide angle
 - Image curves outwards at the edges
- Pincushion distortion for telephoto
 - Outer parts of image curve inwards
- Astigmatism for wide angle
 - Outer corners of image lose sharpness

Lens distortion

Straight lines



Pincushioning

Barrel distortion



Chromatic aberration

Lens distortion

- Chromatic aberration
 - Purple fringe at edge of image and light/dark boundaries
- Vignetting
 - Loss of brightness at corners of image often due to shadowing by lens barrel

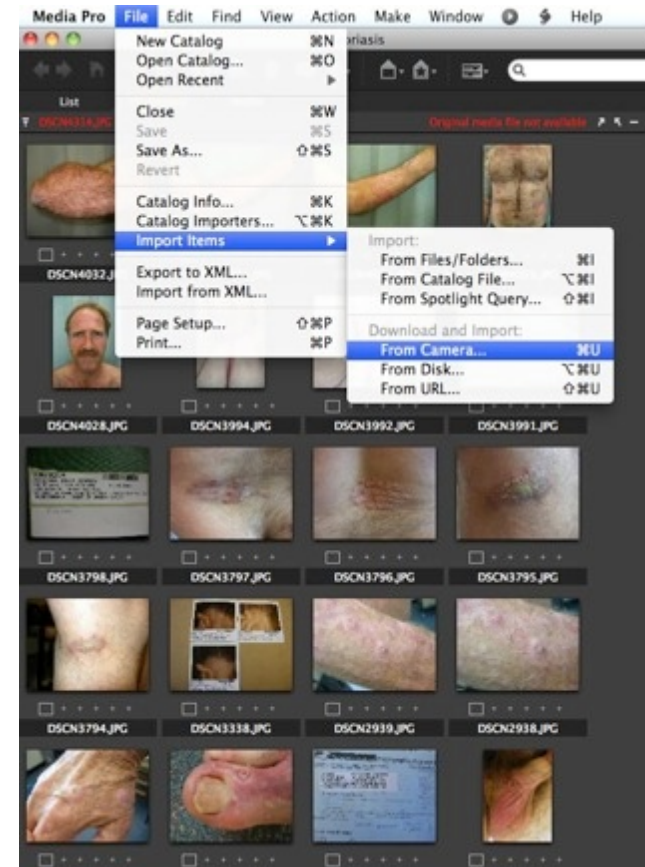
TRANSFER & ARCHIVING



Transfer to computer



- Firewire
- USB cable
- Card reader
- Wireless
- Email



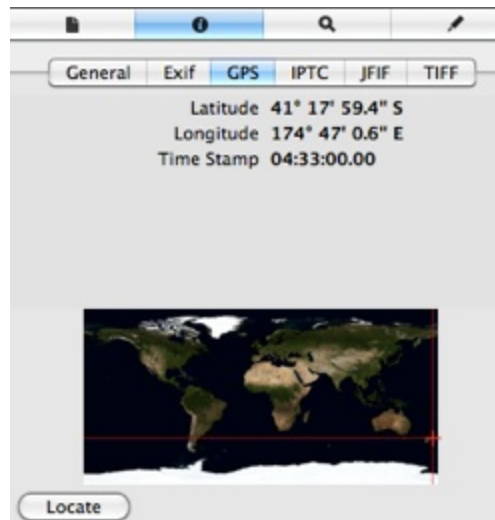
Transfer to computer

- Drag & drop
- Camera transfer software
- Archiving software transfer systems

Archiving

- Free software
 - Windows picture viewer
 - Photoshop Album
 - iPhoto
- Expensive software
 - MediaPro
 - Aperture





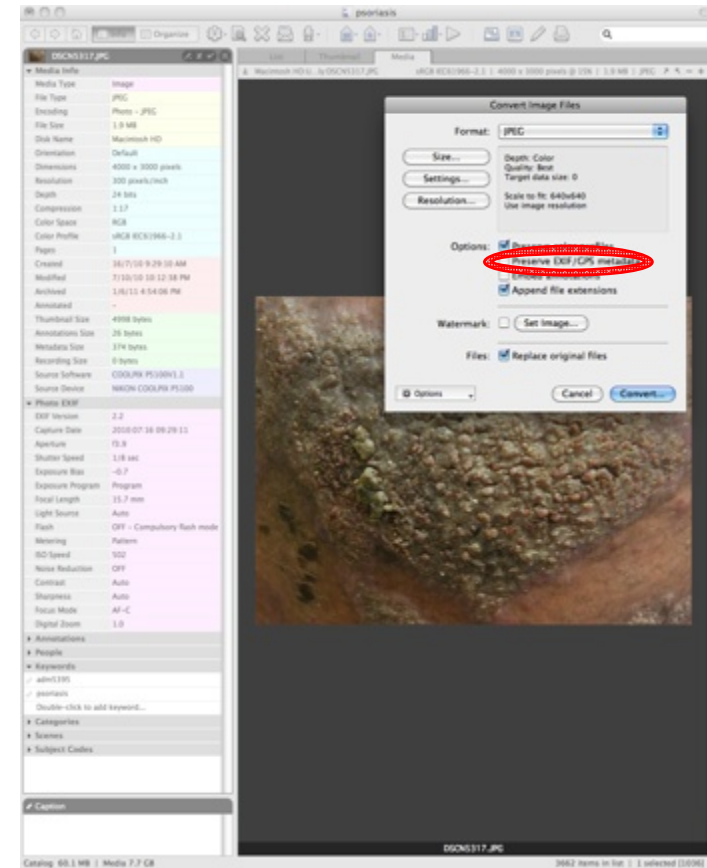
EXIF metadata

Photo EXIF	
EXIF Version	2.1
Capture Date	9/9/06 11:38:50 AM
Aperture	f3.3
Shutter Speed	1/57 sec
Exposure Bias	+0.0
Exposure Program	Aperture Priority
Focal Length	14.5 mm
Light Source	Auto
Flash	OFF
Metering	Pattern
ISO Speed	100

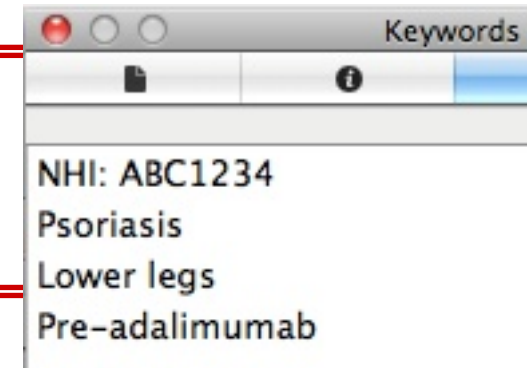
- EXchangeable Image File
- Records:
 - Time and date image taken
 - GPS – i.e. location
 - Exposure, f-number, ISO, shutter speed, subject distance, white balance, flash
 - Contrast, saturation, sharpness, gain
 - Resolution, compression, file size
 - Etc.

EXIF metadata

- Data may be lost after transfer
- Date may be lost after editing



IPTC



- Use software to add keyword
 - NHI / identity number
 - Disease
 - Site
- Save the annotations to the file
 - Enables search on keyword

Computer display

- Video card & monitor compatible
- Video card >16MB RAM
- At least 24 bit (True) colour
- Refresh rate >70 hz
- Dot pitch number <0.28 mm
- For 17-inch monitor, 1280x1024 resolution
- For iPhone, xx

Editing

- Many free programs
 - iPhoto
 - Windows
- Industry standard is Photoshop
 - Photoshop Elements \$350
- Crop, improve brightness, contrast, colour balance
- Always save edited file with a new name or in a different folder/directory

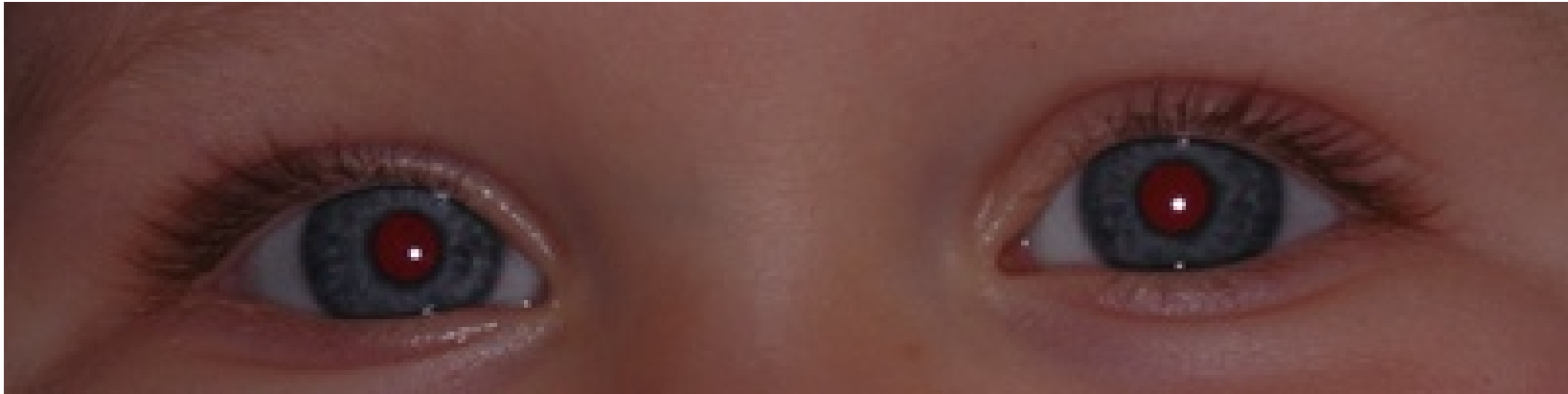
Brightness / colour balance

original



✓

Eliminate red eye



Emailing

- Ensure patient is not recognisable
- Do not include patient name
 - or use a secure VPN or certificated system
- Reduce resolution for emailing (640x480)
 - 'Optimise' to reduce file size

Preview: adjust size

Image Dimensions

Fit into: Custom pixels

Width: 190 pixels

Height: 137 pixels

Resolution: 72 pixels/inch

☒ Scale proportionally

☒ Resample image

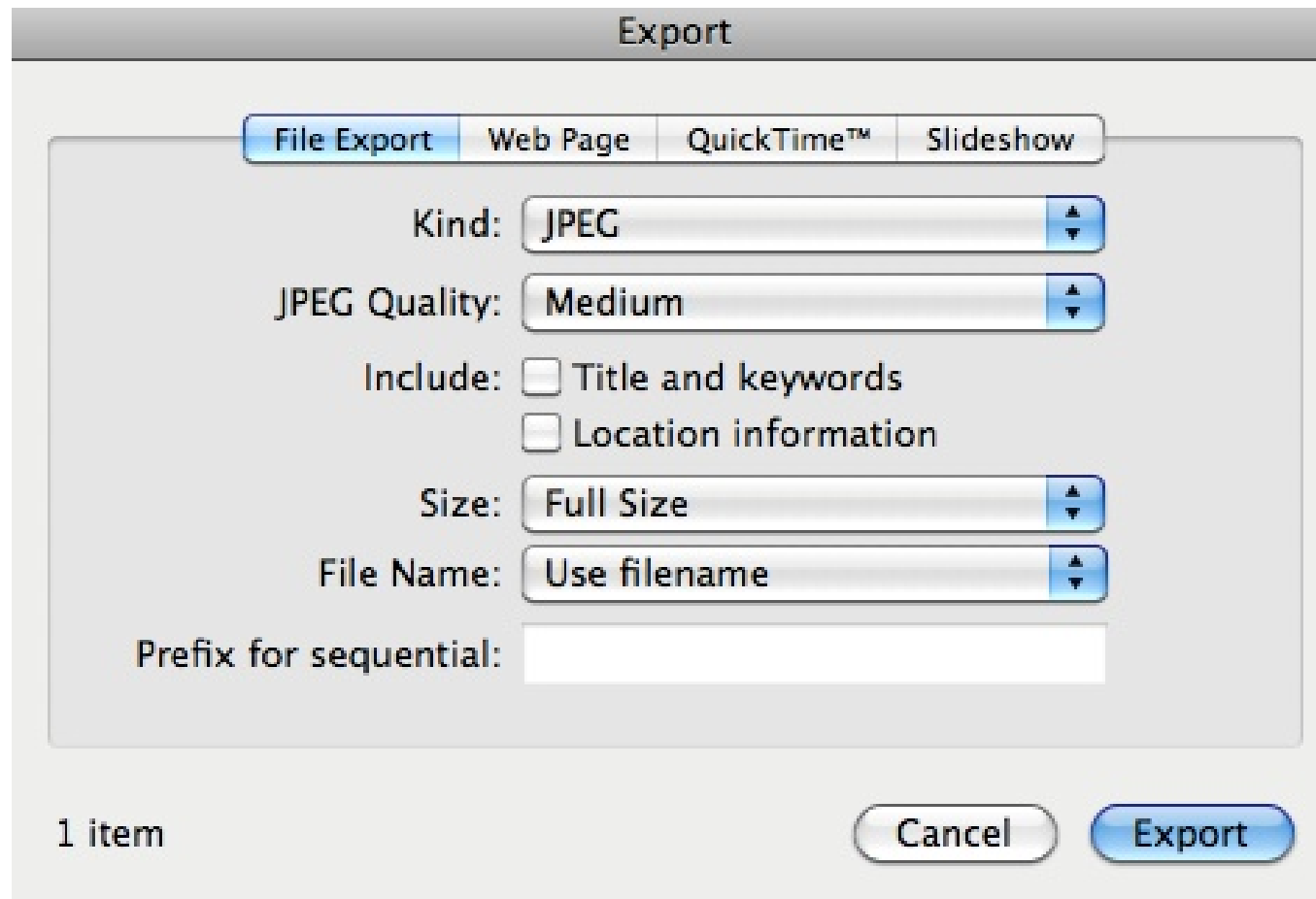
Resulting Size

6.7 × 4.83 cm

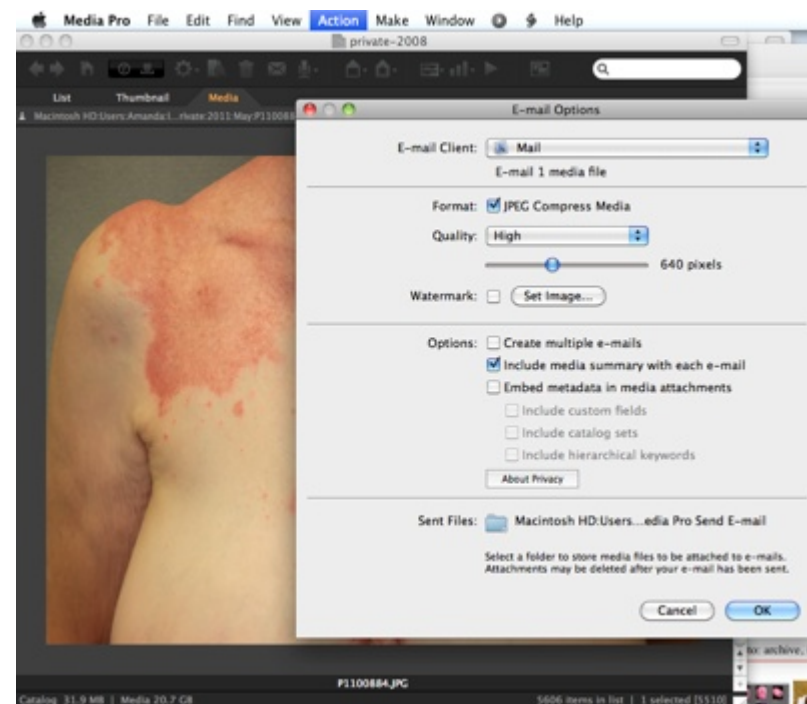
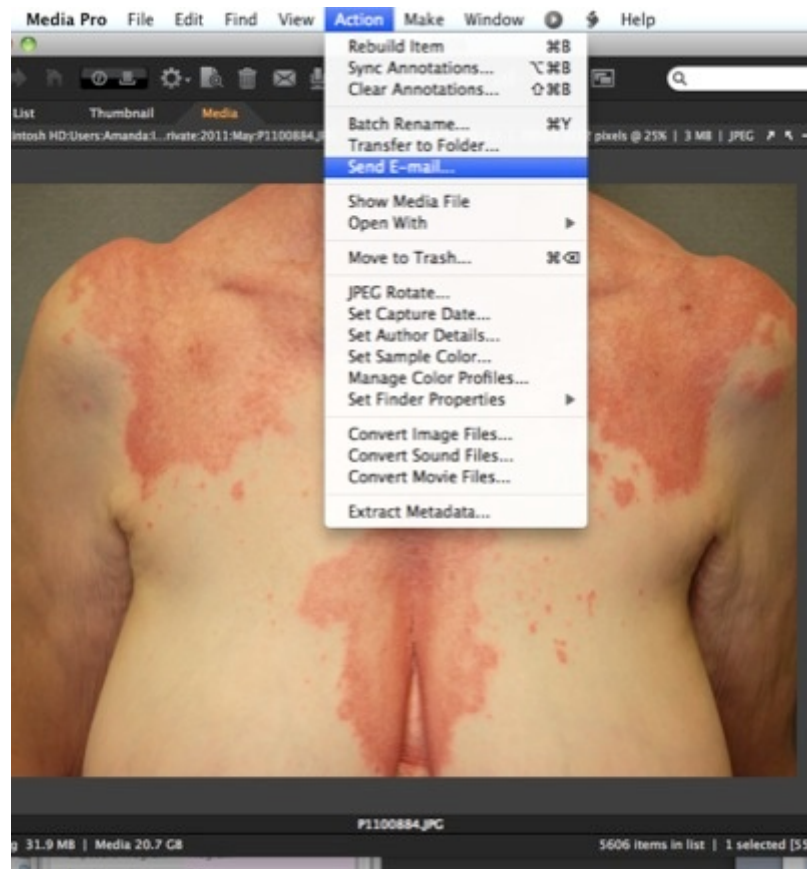
15 KB (was 15 KB)

Cancel OK

iPhoto: export file

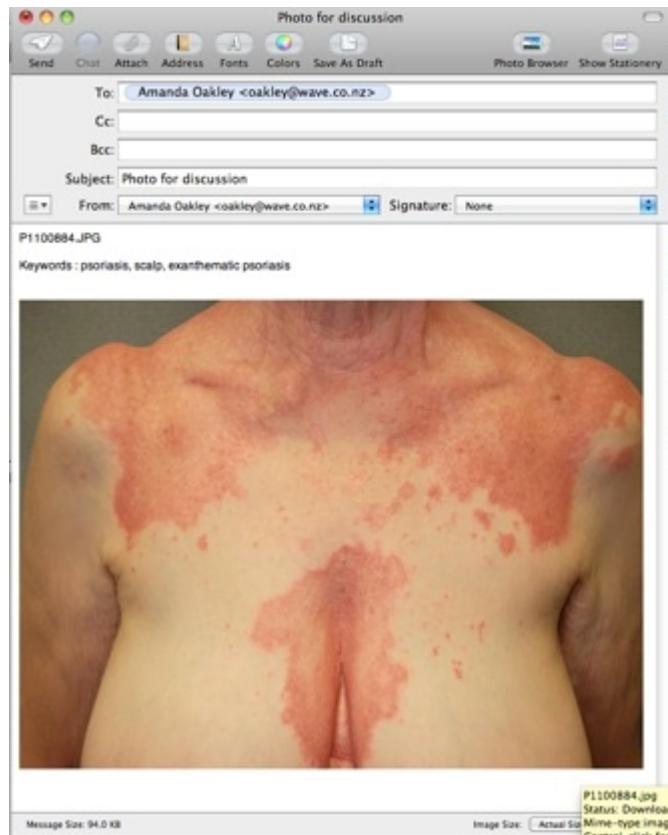


Emailing with MediaPro



Emailing with MediaPro

94KB



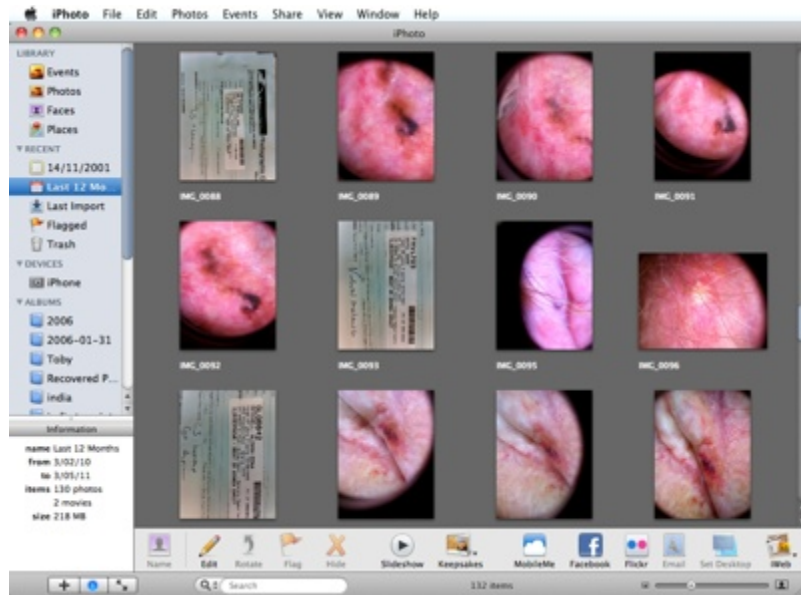
3MB



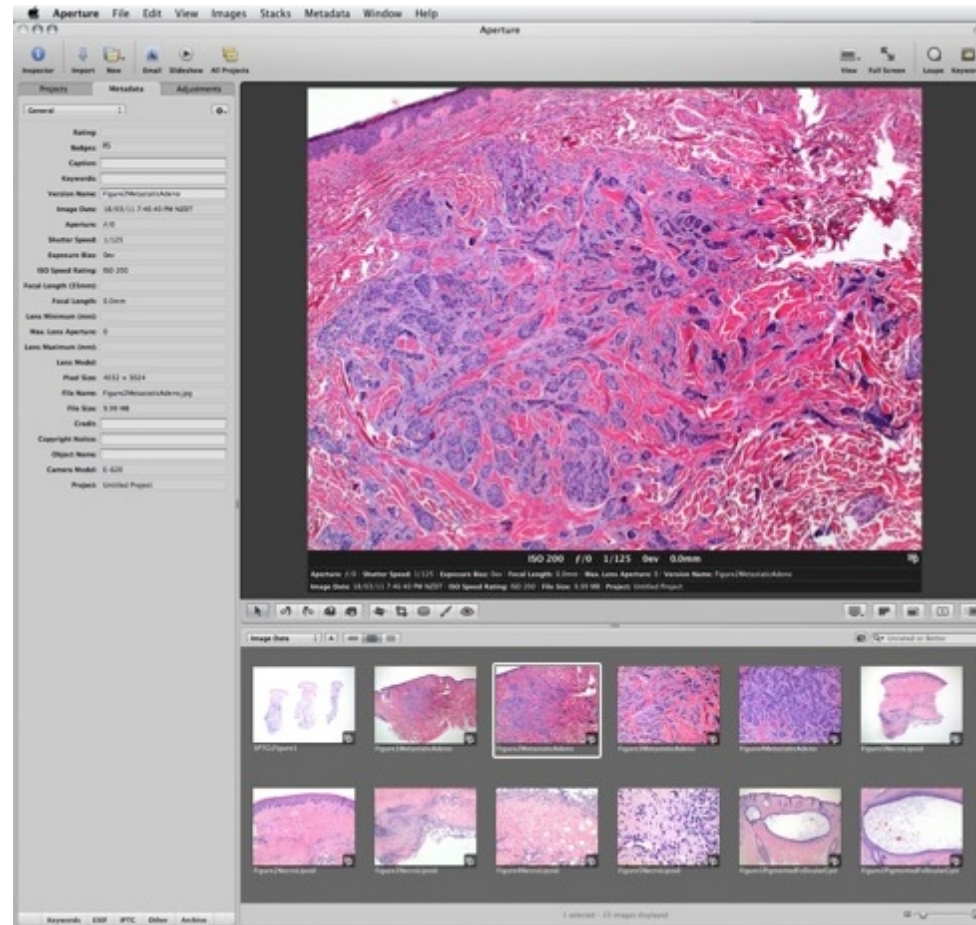
Archiving software

- iPhoto
- Aperture
- MediaPro

iPhoto: archive, iBook etc.



Aperture



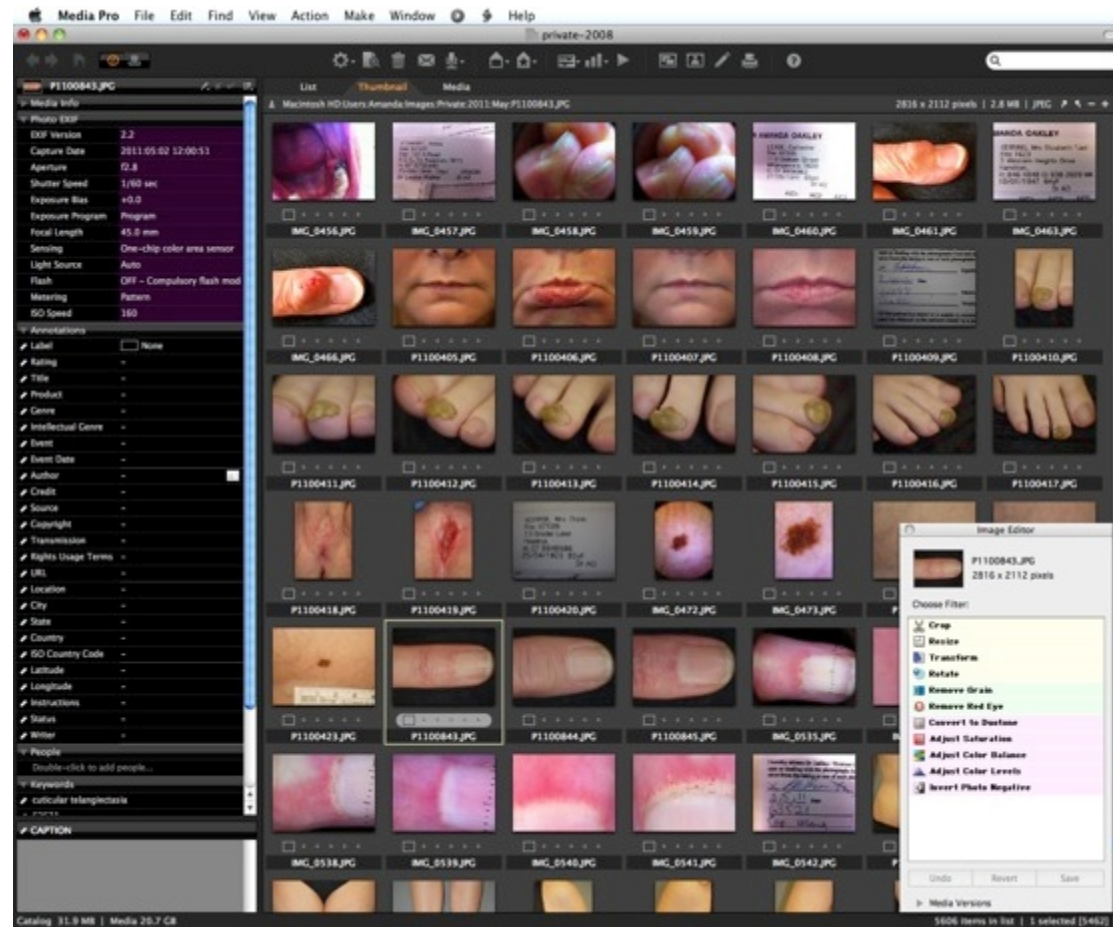
PhaseOne MediaPro

- Upload, store, search, view, slide show, sort, rename, duplicate thousands of files
- Add keywords, descriptions etc and search or sort by these
- Batch tasks for multiple files
- Editing functions
- Email reduced size, copyright protected files
- Many other functions ...



US\$199

MediaPro



Further resources

- <http://www.megapixel.net>
- <http://www.adobe.com/>
- <http://www.apple.com/>
- <http://www.phaseone.com/>

CAMERA SETTINGS

Camera settings

- Resolution
- Compression
- ISO setting
- Metering
- White balance
- Exposure compensation
- Focus



Image resolution = no. of pixels

20 x 20 px



240x240 px

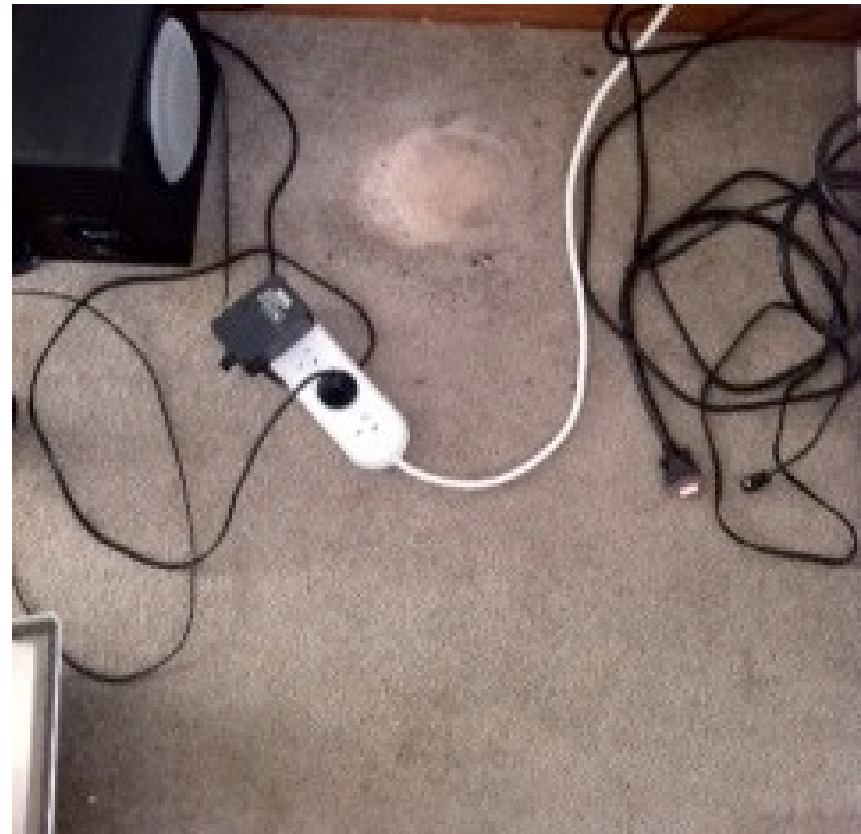


Image resolution for skin images

- Also called 'Picture Size'
- Capture the image at highest resolution/size
- Reduce if running out of space on card
 - Better to upload to computer and delete the images on the card

Compression

- Also called 'Quality'
- Used to reduce file size & speed up transfers
- Choose 'Best Quality'
- JPEG format (.jpg)
 - Low compression = higher quality
 - High compression = low image quality
 - Blurred edges of sharp objects
 - Reduces colour range

Compression

42k: 60% compression



6k: 60% of 60%



5k



5k

ISO setting

- Auto or low ISO best (64-400) to avoid distortion / blurred image
- Low ISO requires more light, a still subject and a stable camera
- Experiment!

ISO

100



200



400



800

ISO

100



200



400



800

ISO

100



400



800



1600

Metering

- Centre-weighted metering
 - chooses exposure to suit focus point
 - takes rest of frame into account
- Spot metering
 - evaluates focus point
 - allows precision: good for macro
- Averaging system: pattern or multi-metering
 - reduces chance of underexposed or overexposed areas
 - good when subject is well and evenly lit

Metering

Partial



Center-weighted average



Spot



Pattern

Metering

Center-weighted average



Spot - focused on dark area



Spot - focused on light area



Spot -focused on midrange

Metering - big contrast

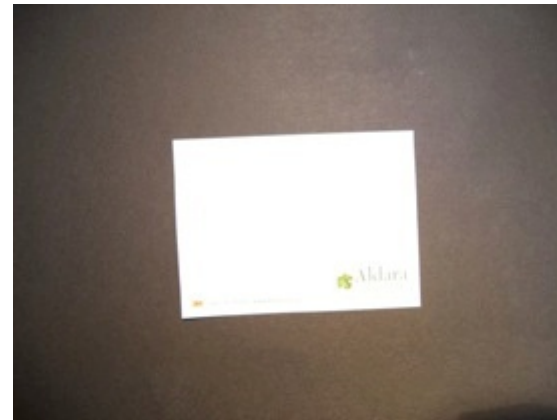
Multi/pattern



Center-weighted average



Spot - focused on white center



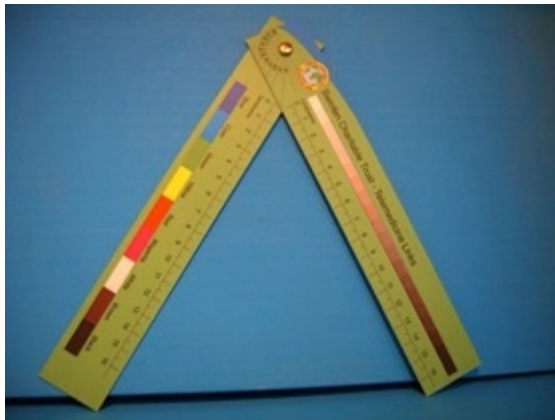
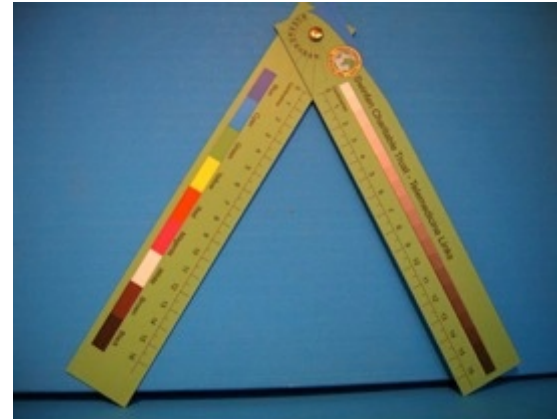
Spot - focused on black surround

Metering - small contrast

Multi/pattern



Center-weighted average



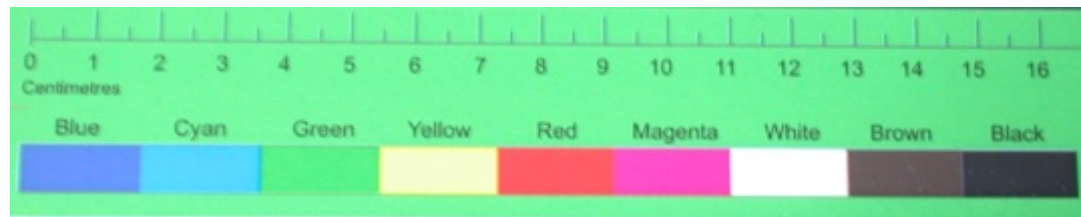
Spot - focused on blue center



Spot - focused on green ruler

White balance

- Colours vary according to light source
- Auto usually best
 - experiment with other settings
- Fluorescent lighting can shift colour
- Use a white card or standard colour card to check colours in your room



White balance (no flash)

Auto



Daylight



Cloudy



Tungsten



Fluorescent



Speedlight

White balance (no flash)

Auto



Daylight



Cloudy



Tungsten



Fluorescent



Manual

Exposure compensation +/-

- When auto exposure is not perfect:
 - To make image brighter: up to +2 EV
 - To make image darker: up to -2 EV
- Auto-bracketing – 3 images at different exposure settings e.g. -0.3, 0, +0.3
- Auto setting may underexpose white skin

Exposure compensation

+2.0

+1.0



0.0



-2.0

-1.0

Exposure compensation

+2.0



+1.0



0.0

-2.0



-1.0



Auto-bracketing



-0.5 EV

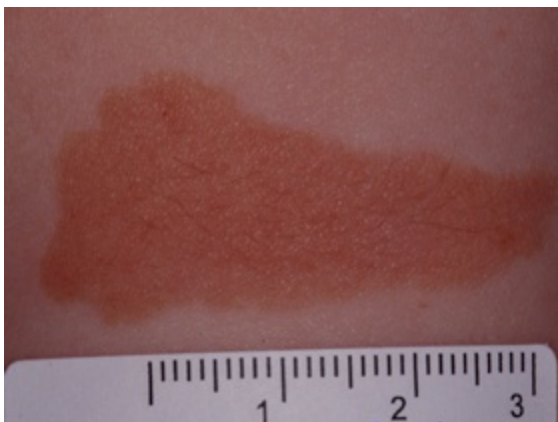


0.0 EV

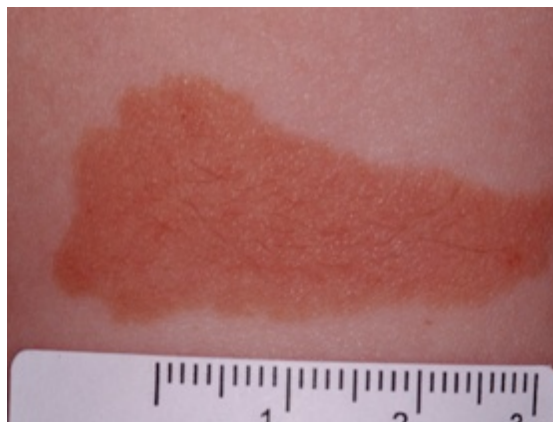


+0.5 EV

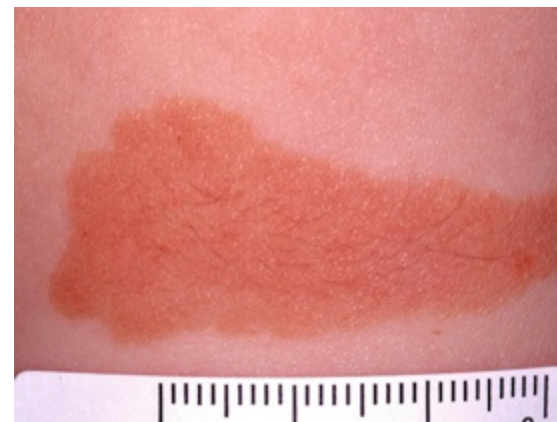
Aperture priority ✓



F14 s/s 1/125



f20 s/s 1/125



f25 s/s 1/125

Aperture: depth of field



F8 s/s 1/3



F4.6 s/s 1/11



F2.5 s/s 1/30



F8 s/s 1/15: big DOF



F2.5 s/s 1/100: small DOF

Fixed aperture: variable shutter speed

F2.5 s/s 1/100



F2.5 s/s 1/30



F2.5 s/s 1/10



F2.5 s/s 1/2

If image is noisy:

- Reduce ISO
- Increase light
 - Add external light
 - Increase aperture
- Increase shutter speed
- Reduce compression
- Save as TIFF / RAW uncompressed image



Any questions?

oakley@wave.co.nz