Best Practice for Capturing and Presenting Accurate Wound Images

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Images provide reference detail to wounds, from which point treatment and research discussions commence. All too often the results of exiting research or innovative treatment regimes are let down by the lack of image quality or presentation detail.

This poster does not list high-end imaging techniques or demonstrate the latest PowerPoint (PP) wizardry. Its goal is to provide practical guidance (or a pause for thought) to anyone capturing or presenting dermatological wound images.

Methods of consistent image capture and presentation are demonstrated alongside those corrective techniques employed by Medical Photographers to rescue substandard images.

The perceived quality and accuracy of a presented image (or a wound sequence) instantly conveys a message to the viewer:

Image content will convey a direct message to each observer – irrespective of the accompanying dialogue, text or graph. Ensure the image content being discussed is clearly captured, presented and pertinent:

Fig. 1: SG Donor site L-R; specular, diffuse and cross-polarised lighting clearly identify surface texture, tissue types and colour only respectively.

Image quality (or lack of) will determine how much confidence the viewer will attribute to that image or the conclusion(s) drawn from it:

Fig. 2: Specular lighting L-R; out of focus, over exposed, wrong colour balance.

Accuracy at the point of capture is best practice

Time will be saved, if spent considering the subject position, angle of capture, inclusion of scale and lighting settings, otherwise this time will only be spent correcting images in Photoshop or PowerPoint later.

In short, if all images are captured accurately then any wound sequence will also be consistent and clearly demonstrate the treatment outcome - thorough note taking or clear user guides will assist the photographer achieve image consistency.

Aim for best practise at capture, then fall back on image editing techniques if required. Do not rely on post capture editing to correct all errors, it cannot adjust pixel information that was not captured originally:

Fig. 3: Monthly CVLU image sequence, aligned via on patient registration marks.

Optimum Positioning

Consider the following priorities, determine the best compromise between each, then document patient/photographer position for imaging and repeat for consistency.

Patient:
1. Flat wound for imaging vs patient comfort, can both easily be achieved?
2. Obstructions vs safety, can all dressings, clothing (jewellery etc) be removed from the image area?
3. Consistent background vs convenience, white disposable roll is preferred or a consistent colour of surgical drape if necessary.

Photographer:
1. Capture the entire wound perpendicular to its centre, as it heals/changes, greater information will be captured. Can both patient comfort and sufficient wound detail to be achieved e.g. could wound indentation photographed from the side – see Fig. 7.
2. Longer focal lengths (zoom*) vs wide-angle, if possible; stand back to capture the entire wound rather than using a wider angle setting; the resultant image has a more natural/flattering appearance, wide-angle lenses introduce image distortion and are less forgiving if the photographer is not quite perpendicular to the wound.

* Optical zoom is preferred; digital zoom just enlarges and crops the image in camera.

Wound Lighting

The preferred and most consistent method of wound lighting, flash, is discussed here. If using ambient light, the points below are applicable and attainable but will require greater effort and expertise to achieve comparable results.

Flash:
1. Has sufficient power to override (changeable) ambient conditions, it's power can be precisely controlled and allows for greater depth of field/sharpness.
2. Direction, filtration and area of the flash light source can easily be configured to highlight a specific wound characteristic:
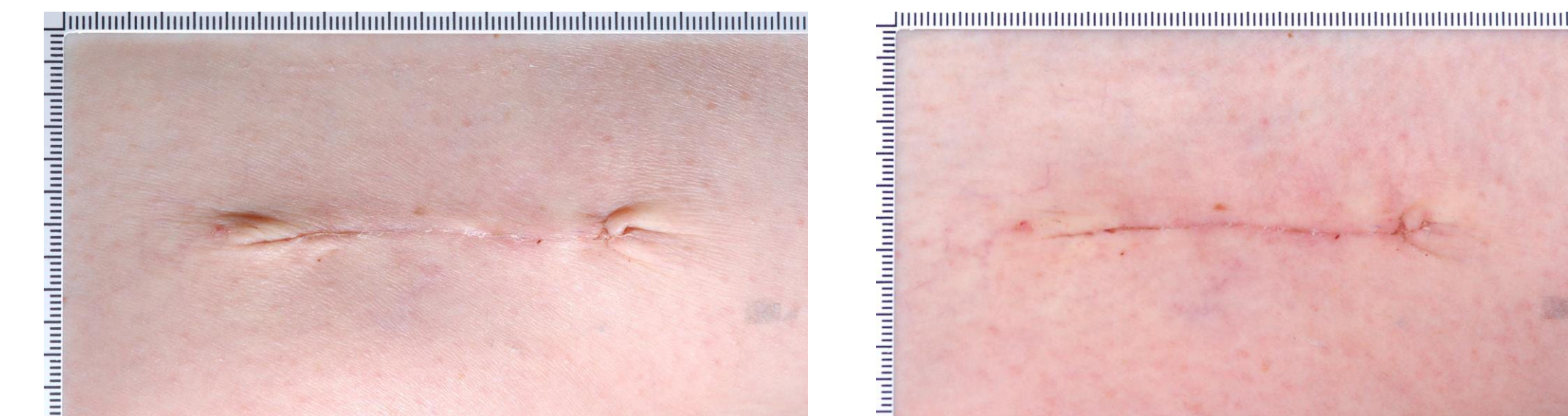

Fig. 4: Excision site L-R; oblique lighting for surface detail, cross-polarised for colour only.

Cheap diffusers reduce glare from on-camera flashes:

Stand-alone flashes can be positioned off-camera and triggered directly (via cable or IR) by the camera:

Fig. 5: Garry Fong type diffuser.

Fig. 6: Nikon SB-R200.

Exposure:
1. Auto (TTL) exposure will adjust the flash output until the image is *correctly* exposed. When calculating *correct* exposure though, the camera is influenced by prominent areas of glare or shadow and adjusts accordingly.
2. Ensure consistent Patient and Photographer positioning to limit exposure variability. Enlarge/inspect your images on-camera, is there too much glare or shadow where greater wound detail would be preferred?

Colour Balance:
1. Auto white balance (WB), as with (TTL) exposure, will result in acceptable images on most occasions, but when such images are placed in a sequence, some will always require adjusting; strong colours influence the auto WB.
2. Manually setting the WB to 'flash' will ensure consistency but not necessarily accuracy. Flash diffusers, patient clothing and surgical drapes all change the colour of light which is illuminating the wound.

Manually calibrate and fix the flash output, camera exposure and colour balance settings to ensure accuracy throughout – please contact as beyond scope here.

Wound Scale

Include scale at the same focal plane (distance) as the wound, wrap around the limb/body so there is always one section perpendicular to the lens; white/grey adhesive tape is preferred, right angled and sterile rulers are available:
1. Place adjacent to wound and retain in final image, alternatively move away from wound (but in same plane) and crop from final image after resizing.
2. If scale is not captured in error, use wound refence points to align a series of images, the result can be professional if all images are taken perpendicular to the lens – as Optimum Positioning.
3. If unable to include scale due to wound position, include within a reference image then omit from the challenging image. Rather than show a selection of inconsistent or low quality images, capture the achievable professionally and align the images as Fig. 7.
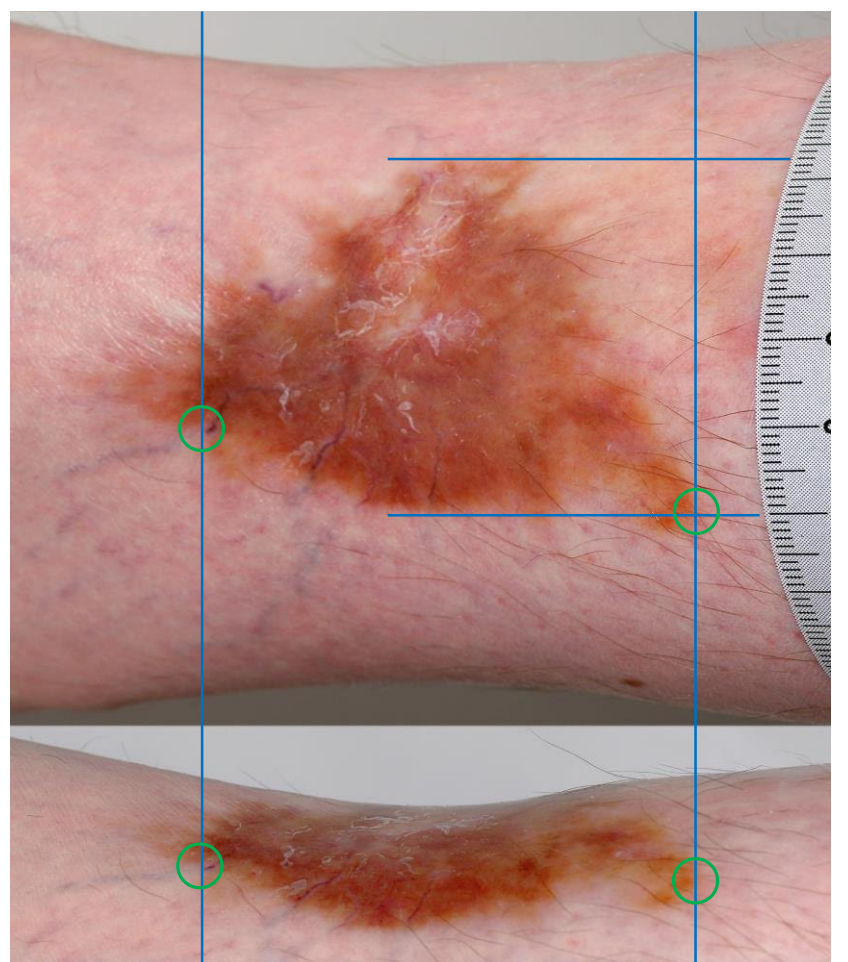

Fig. 7: Compilation images of healed leg ulcer, demonstrating (for info only) points of reference and scale reference lines.

Image Editing

Save the original image unchanged, **always edit a copy** in Photoshop Elements (or similar <£100) for high-end adjustments, or use *Format Picture* within PowerPoint (PP) as required for each presentation. PP offers a diverse range of easy to use sharpness, exposure and colour balance adjustments, in addition to more precise fine tuning adjustments, within each *Format Picture Options* section.

Image Presentation

If the previous sections have been followed (where possible), then cropping and fine tuning any minor image errors will result in a professional presentation. When considering the priorities below, always apply them consistently to an individual wound sequence and where possible throughout the entire presentation:
1. Display all wounds at the same scale/magnification (Fig's 1-3), if a section requires enlarging, show as a separate image and identify its point of origin.
2. Crop-out background or unnecessary distractions but ensure consistent image size within a sequence – tick *Gridlines* within the *View* menu to assist. If both length and width cannot be consistently achieved, align at least one dimension (Fig. 7) or separate the images with a gap (Fig. 4).
3. All images within a sequence should display the same level of sharpness, brightness and colour balance. **Viewers will forgive one inconsistent image if it completes the expected wound sequence.** If a substandard image cannot be omitted, add a small comment beneath e.g. flash failed during visit.

When creating a presentation, use the largest (file size) resolution images (ppi) possible, then save when finalised. If unable to email/display due to file size, save a copy of the presentation, double click on an image to access *Compress Pictures*, then *Compress All Images* – to the next lowest ppi option - and *Delete Cropped Areas*, save and repeat until the presentation can be transferred successfully.