

Clinical Images for Patient Medical Record

This Standard Operating Procedure (SOP) provides guidelines to ensure repeatability and validity of images used in the Medical Record at Martinsburg VA Medical Center. Provisions in this SOP have been developed for digital imaging but general imaging concepts apply equally to film images.

Actually this protocol was developed for a wound care research project. Film photography was used to provide objective data on wound size and appearance changes over the course of treatment. Photographic documentation became standard of care after research project was completed. Protocol was adapted to digital imaging as technology improved to meet image quality requirements. Use of guidelines will also allow different photographers to achieve consistent results.

Unless film images are specifically requested, all serial wound photographs will be recorded using Learning Resources Service standard clinical imaging system:

Kodak DCS 420 with 28mm lens

Nikon Macro Speedlight SB-21 and Nikon AS-14 Macro Speedlight Controller

Flash will be set to 1/4 power in manual mode.

28mm lens on DCS420 is roughly equivalent to 55mm lens on 35mm camera.

Image sites that exceed coverage capability of Speedlight SB-21 will be photographed with appropriate clinical lighting setup in studio.

Non-serial clinical images will be recorded with Kodak DCS 420 and ring light or studio lighting as appropriate for each case. Images intended for publication or use in educational material may be photographed with Kodak DCS 760 or other high-resolution camera if image size/quality requirements warrant.

Ensuring Repeatability:

All digital images for the medical record will be saved in camera native resolution. Changes in pixel resolution will not be made.

When images are changed from native camera resolution (pixel dimension) image re-sampling is performed by software. To accomplish changes in pixel dimension software algorithms add or delete pixels based on a "guess". Removing or adding image data not present in original capture violates image integrity.

In order to ensure repeatability of serial images, a serial image log sheet with patient's name, SSN and the following information will be prepared.

See attachment A, Serial Photo Log, below.

Use of standard camera, lens and flash system will be confirmed on serial image log sheet.

Each site to be imaged will be identified with proper medical terminology. In cases where multiple sites are photographed each site will be listed individually.

Distance from site and *f*-stop will be recorded for each site on initial session. Subsequent images will be made with same settings.

Each site will be photographed from the appropriate distance and exposure corresponding to an exposure combination indicated on distance/exposure chart affixed to camera. Focus will be achieved by "Pull Focus" technique.

Correct exposure for each distance setting on lens barrel has been determined by testing. Appropriate distance is determined by viewing site through viewfinder, then adjusting lens to a focus distance imprinted on lens barrel. Viewing image site through viewfinder critical focus is achieved by moving camera closer or farther in relation to site, this is known as “Pull Focus”.

For example, a small site may need to be photographed from a distance close to .3 meters. Our lens barrel has distance marking engraved at .35 meters. Photographer will set lens distance scale to .35 and pull focus.

Proper *f*-stop setting is always the same for each distance setting when manual flash output is selected. This is the most efficient way to ensure site is always photographed from the exact same distance. Serial images must always be photographed from consistent distance or misleading visual information will be presented to clinicians. This is true even when a scale is included in image. For individuals not practiced in this technique spinning the focus ring is an overwhelming impulse.

For more on magnification ratio please see “digital pitfalls.pdf” also attached.

In cases where multiple sites are photographed on same day, alphabet character (a,b,c) will be entered in log to differentiate sites.

Date of initial and subsequent photographs will be entered in Date section of log.

General requirements:

All sites will include right angle scale in lower left of image frame.

Two 6cm adhesive backed scales are joined at the ends to form a right angle. X and Y legs are situated relative to site so they appear in the lower left portion of image.

All images will be made with standard blue background sheet available from SPD.

We use blue surgical tray wraps. A middle gray background is preferred because it will not impart a colorcast to image but I’ve been unable to find inexpensive middle gray disposable sheets.

For more on background and color perception see “digital pitfalls.pdf”

Photographer will adhere to aseptic technique at all times. Photographer will not be required to remove dressings, bedclothes or otherwise break aseptic technique during clinical photography. Clinician will be available during photography sessions to remove dressings, place scale and background, position patient and clean/prepare site to be photographed.

Image Processing:

Color control and correction will be accomplished by photographing a neutral subject (gray card or white card) with the same light source used for site imaging.

Neutral subject will be used to set white balance in acquire module prior to exporting images to PhotoShop.

Color balance will be achieved by ensuring scale included in image is a neutral value (equal parts RGB) using the information pallet in Photoshop. “Curves” color correction layer will be used to fine tune color balance.

Photographers will use combination of color value measurement tools and professional judgment to ensure image accurately represents the coloration of site imaged.

A calibrated monitor will be used to color correct images.

We use Adobe Gamma to calibrate our monitors. With some careful practice we have achieved very accurate results as confirmed by testing with monitor sensors. As with all things, this is a skill developed through careful practice and professional judgment. I don't recommend this procedure for those unfamiliar with computer based color correction.

Patient name, last 4 SSN and date of image will be annotated (embedded) within image.

Images will be saved in JPEG format using quality setting of 10 in PhotoShop JPEG export dialogue box.

JPEG file format is used as a concession to file storage requirements. Visual inspection of side by side images show indistinguishable image quality at this setting. Visual inspection of images shows very little loss of image quality after 3 Open/Save cycles.

Images will be saved to shared LRS Data directory in appropriate sub directory. Images of each site will be saved as individual files. File name will conform to following naming convention [last,first initial. mm-dd-yy last four(a)]. In cases where multiple sites are photographed on same day, each site will be indicated by alphabet character.

Attaching images to Electronic Medical Record:

Image(s) will be attached to progress note created in association with photography visit. Clinician is responsible for creating progress note.

Site of area photographed will be entered in image note during each capture.

Image attachment will be crosschecked for accuracy by ensuring name embedded in image matches name on Patient Medical Record.

