13 Setting Up a Photographic Medical Studio

Tom Bialoglow and Paola Pasquali

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13.1 Introduction

Most physicians will take pictures of their patients by themselves. Most of these pictures will not be good; others can be very appropriate for the use they were meant for. Setting a photographic studio is a way of giving medical photography the importance it deserves. The studio is more than just a room: it is a concept. It is the physical space where a non-invasive imaging technique will take place. There is no better way to standardize your pre- and post-cosmetic procedure photography than to invest in a medical photo studio. Once the initial investment is done, getting photographs done in a standardized manner will be much simpler.

13.2 Why Do We Need a Photographic Studio?

Creating a photo studio is not a trivial task and requires an investment. For best results, a room should be dedicated to studio photography, and a medical photographer should be engaged for installation and training to ensure photographs are suitable for use in a medical practice engaged in medical photography. For the purpose of this chapter, most considerations will deal with dermatology, plastic surgeons, and orthopedic practices that deal with pictures of the skin lesions, whole face, total body, and extremities.

In general, a good piece of advice is to keep use of the studio simple. The more complex the solution, the more frequent the problems.
A photographic studio has several advantages:

- Reduces time required to take a photograph in the correct conditions.
- It gives more privacy to your patient when taking the picture.
- Contributes in professionalizing your medical image (brand).
- A formalized photographic act reassures your patient.

Disadvantages can be:

- It requires an investment.
- It works ideally with a medical photographer or trained personnel.

Each studio will need to be designed according to the needs of the user. Plastic surgeon’s requirements will probably be different from a department of dermatology’s or a hair specialist’s.

Ultimately, you want to create a room that is comfortable for patients and easy for staff to use and produces excellent, consistent results. Let’s discuss how to make this happen.

### 13.3 Standardizing Photographs

When one speaks about a correct medical photograph, the first word that comes into mind is standardization. This means that by following certain rules, all our images will have quality and will be comparable over time.

Setting up a photographic studio requires taking into considerations aspects that regard the patient, the room, the equipment, and the photographer.

#### 13.3.1 Patient Considerations

As mentioned in other parts of this book, the first requirement before photographing a patient is to have her/his consent. An informed consent form needs to be explained as well as the extent of use of the pictures (medical record, sharing with colleagues/teleconsultation, publication, publicity for the clinic).

As this chapter deals with the studio, make sure you have a space/area/table/chair where sitting and discussing these aspects is possible and where the patient will be able to comfortably read and sign the consent.

Once accepted, the person in charge to take the picture (medical photographer, nurse, technician, and physician) needs to explain what is expected from him/her.

Discussing the photo session with the patient is often overlooked. Telling the patient what to expect and what you will need them to do is important in enlisting their aid. Explaining to a patient that you want them to move in fine increments is extremely helpful when you are fine-tuning their poses. Advise a patient not to move after you have taken their photo until you check and approve the photo. This way if you need to take the same photo again or need to refine the pose further, the patient is still in the same position.

Patient’s privacy is of extreme importance. Respect for intimacy is crucial. The room needs to be in a comfortable temperature for your patents, especially during winter time. They need a seat in the waiting room or area where they have to wait to be photographed, a proper place for their belongings, and some hooks to hang clothing from. Help to older people or a handicap is essential. If room size permits, a draped changing area is nice to provide for patients. This would need to be behind your studio flashes so as not to block any light. For body photography invest in disposable undergarments. This makes for more consistent and professional pre- and post-procedure photographs than photographing patients in their underwear. In addition, modesty garments will make patients feel more comfortable by avoiding unnecessary exposure and photographs of sensible areas.

Hair ties, hair pins, and hairbands in black and shades of brown should be available for restraining hair. Jewelry should be removed and allowed to be placed in a safe place. Make up has to come out for face photography. Keep disposable fabric soft makeup remover tissues at hand.

Positioning aids are helpful in your quest to standardize studio photos. They help get your
patient close to the position they need to be in for photos, but the photographer will often have to fine tune the patient’s pose.

A backless stool for the patient to site on during facial photos should be kept in your photo studio. Acquire a small stage (24 \times 24 \times 10) on which the patient can stand so your photographer may not have to angle the camera downward for capturing photos of the lower legs.

For frontal views, the patient can simply look into the lens. Other views can be placing the patient on a positioning mat marked for foot placement and for frontal, oblique, and lateral poses that can expedite and help standardize patient poses. For oblique and lateral images, providing stickers on the wall for the patient to turn toward and look at will help keep them in place after the photo has been taken and before you turn them to the next pose. Another option is an octagonal piece with the numbers indicating the position. By having this piece of solid material, it will stay more firmly in place, and it will be more resistant; in addition, patients will place their feet tight to the piece further helping them maintain a fixed distance.

The manner in which you ask your patient to pose for the photos and how you ultimately compose your photos for specific anatomy and procedures can benefit from standardization. The author (TB) has collaborated with the American Society of Plastic Surgeons (ASPS), the American Society of Dermatologic Surgery (ASDS), and the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) in photographic standard posters. These posters are sold by the respective societies though in some cases to members only. Frame and display the appropriate poster in your photo studio as a ready visual reference for your staff. Review photos with your staff periodically to ensure they are adhering to the standard you have chosen. These photos will also help patients understand the required position they need to take.

Windowless rooms are preferred but windows can easily be covered with blinds or curtains to keep the lighting environment consistent and to ensure patient privacy.

Rooms should be rectangular at least 6’ by 10’. Pick a room where temperature is comfortable and stable. Remember, your patients will sometimes be wearing only a disposable modesty garment. Door should be mounted to swing into the room so that upon first opening the door the patient is hidden. This way if staff mistakenly opens the door during a photo session the patient is not immediately seen, and the photographer can stop staff from opening the door further. Having a flag outside the room indicating a photo session is in progress is advisable. Mounting a sliding curtain at the door lintel is another possible solution.

One of the narrower walls will become the patient backdrop. That wall should have no electrical or data outlets and should be painted a flat light blue. Some may opt to paint the wall black to make patient shadows cast on the backdrop less conspicuous. TB prefers blue as it is more aesthetically appealing and there is good contrast between light blue and dark skin and hair. Some prefer a neutral color wall, remembering that shadows will be more evident against light colors. Side walls should be painted a flat light gray, white, or neutral color so as not to impact the color of the photos. Some hospitals or clinics that have no such physical space available can set one wall for photography (Fig. 13.1).

Besides preparing a wall, other options for backdrop are fixed or mobile stands (commercially available). PP uses for portrait photography of wheel-chaired patients a wheeled stand with a hanged black velvet to position behind after placing a bib.

If you plan on using a mobile stand, the floor should not be carpeted as this can make moving and adjusting the mobile stand difficult. Ceiling should be white acoustic tiling or painted flat white. Non carpet flooring will facilitate cleaning from one patient session to another, a requirement that has become even more relevant during the coronavirus COVID-19 pandemic.

**13.3.2 Room Considerations**

It is ideal to have a special room for medical photography.
Compared to studio flashes, room lighting is quite dim and typically does not interfere with studio photographs. Your camera will need a bright room to accurately focus. That being said choose ~5000 K LED banks under large diffusers positioned down the midline of a room.

Potent flash light and a patient located away from the wall in a dim light room obviate the need for a backdrop as the flash will illuminate the subject, leaving the back black.

If you will have a computer in your photo studio, add a quad electrical outlet and data drop on the right or left 5 ft from the patient backdrop wall. If you will be using this PC to import and manage your photos, a data drop is essential as Wi-Fi can be slow when handling high-quality, high-resolution digital photos. Remember to turn off the monitor at the end of the photo session so that the patient’s images are not visible to anyone.

13.3.3 Equipment Considerations

Maintaining the equipment in the photographic room has many advantages:

- You will always know where the camera is to be found.
- By placing them in the appropriate shelves, they will have less chance for accidental falls caused by mobilizing them.
- Equipment will be adjusted to standardized light and distance.

It is important to guarantee that the room dedicated to photography has safety conditions (safety windows, keys available only to certain personnel). Equipment is expensive and safety is an important issue.

Equipment should include:

- Lighting
- Cameras
- Lenses
- Tripod (tripod, monopod, or mobile camera stand – the capture plane can be kept parallel to the anatomy being captured and distance to the patient can be better managed)
- Positioning mats or numbered octagons
- Hair pins, diadems, make up removal
- Chairs to sit patients

Fig. 13.1 Palette of suggested colors to paint a wall and use it as backdrop
• Backdrops (different colors)
• Stands for backdrops
• Different accessories for cameras: batteries, memory cards, chargers
• Specially designed stands for hair photography

Most of this has been covered in the chapter on Equipment. We will focus mostly on artificial lighting.

In a photo studio, exposure times are short, which helps minimize patient and operator motion in photos. Standardization covers aspects that relate to:

• Light intensity
• Colors (white balance)
• Distances
• Angle of incident light
• Camera parameters
• Focal length

13.3.3.1 Lighting
Outside of choosing the right room, lighting selection might be the most important component in your photo studio. Monolights are the best choice for lighting in a medical photo studio.

Monolights are studio flashes with their own built-in power supply. In short, they plug directly into an electrical outlet; this provides much greater flexibility than other types of studio flashes. Monolights are the best solution for a medical photo studio. They can be used with or without softbox (Fig. 13.2).

Here are suggested requirements for monolights:

• 400 W/S (or greater) power
• Recycling time <2 s at full power
• 5 stops (or greater) power control
• Digital power display
• Audio and visual flash ready indicator
• User replaceable flash tube
• Possesses a sync port
• Cable, optical, and radio sync capability
• Built-in receiver for manufacturer radio sync

Medical photography is a mission-critical application. Entry-level hobbyist monolights are not robust and dependable enough and will likely not meet the requirements above. You will need to invest in professional monolights. Expect to pay USD 600 per monolight at a minimum. It is advisable to purchase a back-up monolight. If one of your main lights stops working, sending it to the manufacturer for repair means being without one of your lights for at least a week. That means no studio photography during that time. Invest too in a spare back-up flashtube.

Fig. 13.2 Examples of studio monolight without a diffused (left); with a diffuser (right)
Along with your monolights, you will need to purchase light modifiers. Softboxes present a narrower profile and better control the spread of light than umbrellas. Softboxes come in many sizes and shapes. Narrow strip boxes are a good choice in a medical photo studio as their narrow profile allows for smaller rooms to be used for photo studios. Choose a strip box 9”–14” wide and 24”–40” long.

To attach your softbox to a monolight, you will need an adapter called a speedring (Fig. 13.3). Different brands of softboxes can be mated to different brands of monolights with the right speedring. The speedring will allow you to rotate your softboxes 10–15° with some brands, 360 with others. Generally softboxes are mounted on the light parallel to the walls on which they are affixed so the ability to rotate a great deal is generally not important. The adjacent wall would preclude much rotation anyway.

Lastly, it is best to choose a set of monolights from a manufacturer that has their own radio trigger. An integrated receiver is a simpler solution for triggering your lights than using third-party radio transceivers like PocketWizards. With PocketWizards you would need one mounted on your camera’s hot shoe and one connected to the sync port of one of your monolights. Each PocketWizard needs either batteries or an AC adapter. With an integrated solution, the receiver is built into each light so only the manufacturer’s transmitter is required. A built-in receiver is better too because the monolight will not fire unless it is fully charged.

**Installing Your Monolights**

Monolights can be placed on light stands, but a more professional and seamless solution is to affix the lights to the side walls. This will create far less clutter and be more aesthetically pleasing. This will create a more consistent lighting environment as light stands are more easily jostled and moved.

To install your lights, you will need the following:

- Two baby plates with a 90° pin
- Eight metal drywall anchors
- Eight finishing washers
- Screw driver or power drill/driver
- Level
- Pencil
- Measuring tape
- Step ladder

Lights need to be equidistant to and aimed at the same angle toward the patient. A 45° angle, if achievable, is ideal. Less than 45° and the lights become too lateral to the patient which can begin to create dense shadows between breasts, between legs, and on either side of the nose. More than 45° is fine but do not exceed 60°.

The following scenario describes installing your lights in a dry-walled environment. Installation of lighting in a poured plaster or stone environment is beyond the scope of this discussion.

First ensure you do not install your light where a door will open against it. If you have no choice, place a door stop in the floor to prevent the door from swinging into your light. Know your local ordinances, it could be that a door not opening all the way can be a code violation.

Next, you will need to examine your wall for metal studs with a stud finder. Locate studs in
both walls before installing either light. Always identify where both lights will be affixed to each wall before beginning installation. You could install one light and then find there is a metal stud in the same place on the opposite wall precluding symmetric installation of both monolights.

Mark 68″ (172 cm) lightly on the wall with your pencil—this will be where the bottom of your baby plate will be. Measure the distance from the back wall to where the back edge of the baby plate will be. Ensure the distance from the back wall is the same for both baby plates. Hold the baby plate against the wall, with a level across the top to ensure the top edge of the plate is parallel to the floor. With a pencil lightly mark the four outer holes on the wall.

Before driving your drywall anchors into the wall, use your Phillips head driver to make a small hole where you marked each of the four holes on the wall. Drive the anchors into the wall until it is flush with the surface of the wall. If you measured poorly and find you are hitting a metal stud, sometimes you can use other holes on the baby plate as they will afford additional clearance from the stud. Put a finishing washer around the eight screws that were included with the drywall anchors. The screw head will recess into the finishing washer to provide a cleaner, more finished appearance than a bare screw head alone.

Align a baby plate with the post pointing up with one set of anchors and drive the four screws (wearing their finishing washer) into the wall almost all the way. Place your level across the top of the baby plate and adjust the plate into parallel. Hold the plate in that position as you drive the screws the rest of the way into the wall. Repeat these steps with the other wall.

You can now place your monolights atop the posts and angle both lights into the midline and down about 10°. Bundle any excess power cable—or purchase cables of a shorter length to eliminate excess cable.

If you are designing a room to be used as a medical photo studio with an architect, have your power outlets installed the proximate to where the light will be. This will look more refined than having a long power cable running to an outlet close to the floor. Besides, it reduces risk of accidental tipping over. Have both of these outlets on a switch so staff can easily turn the lights on and off at the beginning and end of the day. The lights will be rather high and the monolight power switch may not be very visible. Having the lights on a switch will keep someone from fumbling around the back of the light and changing settings as they attempt to switch the light off. Some examples of possible settings are shown in Fig. 13.4.

13.3.3.2 Camera and Lens

Any interchangeable-lens camera, mirrorless, or SLR is a good solution in a photo studio. Choose a camera with a viewfinder whether optical or electronic. Do not shoot by looking at an LCD screen on the back of the camera; look through the viewfinder. When shooting in live view with an SLR, there is significantly more lag after depressing the shutter button and some cameras will provide a preview that is too dark to be useful when shooting in Manual exposure mode. Resolution of 16MP or better is recommended. Both full-frame and APS-C cameras will provide excellent image quality in a photo studio as there is an abundance of light.

It is recommended to have a back-up battery for your camera and more than one memory card. Ensure date and time are correct as this information is embedded in the photo’s EXIF data and will be displayed in image management applications.

Choose a lens with a fast large aperture of f/4.0 or better. Large aperture lenses are typically better optically and will allow for a brighter image when looking through the viewfinder. The “kit” lenses often included in cameras are rarely the best option for medical photography. Do not use a zoom with a big range. Usually a 3–4× is plenty for clinical photos. 24–70, 28–75 or 24–105 mm zooms will all work well in a photo studio. If you are only taking photos of faces opt for a non-zoom lens, a “prime” lens, this removes focal length as a variable. On an APS-C camera, 60 mm is a good focal length, 105 mm for a full-frame camera.

In a monolight-equipped photo studio, you will have an enormous amount of light for your
clinical photos. This will allow for you to use camera settings to minimize motion blur, keep image noise levels low, keep the depth of focus broad, and maintain consistent color fidelity. In a medical photo studio, it is recommended to use the following parameters and adjust monolight power rather than camera settings to ensure proper exposure:

- **Mode:** Manual (most common mistake in a photo studio is to use a mode other than M)
- **Exposure time:** 1/125 S (shorter exposures can preclude proper sync with the shutter)
- **ISO:** 200 (noise is very low at ISO 200; allows for use of lower monolight power)
- **Aperture:** f/16 (ensured broader plane of focus)
- **White balance:** Daylight (studio lights produce light of a daylight color temperature)
- **Quality:** fine JPG (RAW files optional for those who know how to manage them)
- **Size:** L (set to the camera’s full resolution)
- **Focus mode:** AF, Single, all focus points on

Cameras will also have Picture Style, Control, or other modes that dictate how the camera will process the capture to JPG. Set that to Neutral.

A wheeled camera stand, tripod, or monopod can be useful accessories. Marking a spot or line on the floor where your stand will be located helps standardize camera to patient distance (use the zoom to frame anatomy appropriately). Pick a camera platform that allows you to mount a camera in landscape and portrait. Adding an L-Bracket or lens-mount ring to your camera will expedite switching between orientations.

If you choose a tripod, pick a sturdy model with ball-head or pistol grip ball head which allows for quick, intuitive adjustments. Some rolling stands will include LEDs to standardize camera to subject distance without the need to mark your floor.

**Fig. 13.4** Examples of studio setting placing monolights on lateral walls. On the left, the suggested distance from photographer to patient is 3 ft (approx. 1 m) for facial and small field photography; 6 ft (approx. 1.8 m) for half body and total body photography, using a 60 mm lens. It is helpful to mark these distances on the floor for fast reference. On the right, the monitor is placed on the back corner to shorten the distance to consult TV in next room.
13.3.4 Considerations on the Photographer

Setting a room with the ideal conditions and purchasing the proper equipment will be meaningless if we do not count the person with the expertise. The ideal situation is to have a professional photographer; however, this is not always possible, mostly for economical or availability reasons. What is possible, however, is to try to have always the same person in charge of photographing. The advantages are that this person will gain expertise over time and know what type of images you need; a second and important benefit will be that patients will feel comfortable if they are photographed by the same individual and understand what is expected from them. A professional relation gets established between the patient and the photographer which facilitates the work of the latter while leaving a sense of ease on the photographed subject.

The photographer needs to know why that picture needs to be taken, what it is that wants to be documented. Since she/he will relate to patients who will sometimes need to undress or show sensitive body areas, proper codes of conduct and dressing are required.

13.4 Image Management Applications

Since you are taking high-quality photos, having an application to manage your photos is a logical final destination for your images. If you have an EMR that could be the final repository for your patient photos, they will treat photos like any other file you might want in the patient record (metadata will be included, DICOM standards).

There needs to be a physical place for storing and post-processing these images. As it is a work that takes time and requires privacy, the same photographic studio could be the place. Pictures can be taken, uploaded, and post-processed all in the same physical area. Proper settings will be required (table, chair, computers, hard disks, software).

There are certain features to look for in an image management application:

- Tethered capture—capture over USB directly into the patient album.
- Ability to add keywords to images—searching by diagnosis, procedure, and/or other criteria makes your photos a much more accessible and powerful resource.
- Show images side by side—essential for pre-/post-procedure review.
- Export images at lower resolution for web use.
- Networkable—if you will want to view your photos in another room other than your photo room.
- Secure—only credentialed users will have rights to data. Data should be sent only through secured systems.

High-resolution, high image quality photos are big files. Calculate 7 MB and greater per photo and you will be taking five or more photos for many of your patients. Wi-Fi is slow for this work. You will want a 1GB cabled Ethernet connection to upload and download images to your server in a networked workflow.

13.5 Conclusion

An ideal medical photograph is the one taken by a person with experience in medical photography who has the proper equipment in a proper physical place. Setting up a studio requires an initial investment that will result in an improvement in the quality of photographic images as well as in the personal (brand) image of the medical center.