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Authors

Michelle, Lauren
Torabi, Sina J
Hutchison, Dana M
et al.

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Standardizing a Compact Medical Photography System for Use in Facial Plastic Surgery

Lauren Michelle, BA,[1,2] Sina J. Torabi, MD,[1] Dana M. Hutchison, MSc,[2] Wolfgang Beumer, MD,[1] and Brian J.-F. Wong, MD, PhD[1–3,*]

Within the field of facial plastic and reconstructive surgery (FPRS), medical photography is paramount for preoperative and intraoperative planning, medicolegal documentation, and monitoring patient progress.[1–3] Despite its importance, properly obtaining medical photography can be a daunting task for surgeons, as most are not trained photographers. Thus, they must self-educate themselves on camera gear and technical specifications to avoid causing visual distortions that can affect outcomes.[3] This is confounded by spatial constraints, as having a large photography studio may be difficult in expensive cities and near impossible in shared academic clinics. We aim to educate readers on camera specifications and present a portable compact standardized photography setup for FPRS clinics that can be reproduced by a nonprofessional photographer.

The three components of creating technically excellent photographs with minimal variance are positioning, lighting, and exposure.[3] By adhering to fundamental photographic principles, we create uniform images in a small rectangular clinic utility room, which contains commercial overhead fluorescent lights. Our photography system features a 6D Mark II digital single-lens reflex (DSLR) camera with a Canon EF 100 mm f/2.8 L macro IS USM lens.

First, to achieve proper positioning, both lens focal length and photographer distance from the subject must be kept constant. To avoid facial distortion and variation between photographs, the camera should be held at the same height off the ground by utilizing the same photographer for all photographs, or by using a monopod or tripod. Because focal length affects feature proportions, appropriate lens choice is key; minimal distortion can be achieved between 85 and 105 mm.[4] Utilizing mobile phones for photography may be tempting; however, their small sensor size combined with wide-angle lenses causes facial feature distortion.[5]

On a full-frame DSLR, our fixed focal length 100 mm macro lens accurately represents the subject's features and, at a distance of 1.8 m from the subject, provides a depth of field of 25 cm, capturing the entire face in focus. Lens choice should be modified appropriately if using a cropped-sensor camera.

Second, lighting should be soft and even to avoid harsh shadows or overexposure. Windows should be covered to minimize changes in ambient light.[3] Typically, lights should flank the photographer, directed at the subject at a 45° angle.[3] If a classic studio setup is not feasible, a ring light or single camera-mounted flash directed upward to provide bounce-back off the ceiling may be sufficient. Our system features two camera-mounted flash strobe lights at full power, with one flash attached to the camera body's shoe mount at the apex of the camera and the other at its base. When the camera is held in a portrait orientation, flash bounce back is reflected off each wall to provide even and equal light back onto the subject (Fig. 1).

[1]Department of Otolaryngology, Head and Neck Surgery, University of California Irvine, Orange, California, USA.
[2]Beckman Laser Institute, University of California, Irvine, Irvine, California, USA.
[3]Department of Biomedical Engineering, Samueli School of Engineering, University of California Irvine, Irvine, California, USA.

*Address correspondence to: *Brian J.-F. Wong, MD, PhD, Beckman Laser Institute, University of California, Irvine, 1002 Health Sciences Road, Irvine, CA 92612, USA,* Email: bjwong@uci.edu

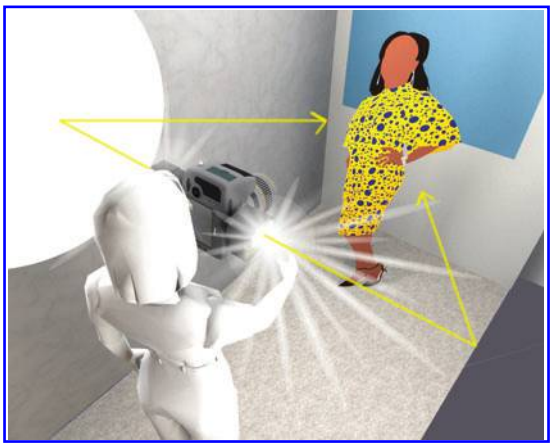

Fig. 1. Illustration of spatial relationship between camera, flashes, photographer, and subject.

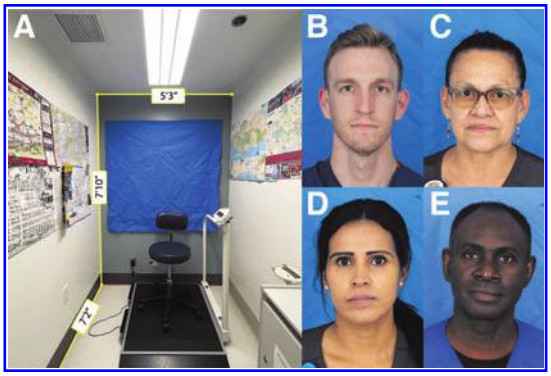

Fig. 2. **(A)** Small clinic utility room (2.1 m deep × 2.4 m high × 1.6 m wide) converted to a mobile photography studio for use in an academic facial plastic surgery practice. **(B–E)** Sample photographs of FST II, III, IV, and VI. Beginning with B in a clockwise order, portraits shot at ISO 200, 250, 400, and 500. FST, Fitzpatrick skin types.

Third, correct exposure is achieved by balancing the triad of camera ISO (sensor sensitivity to light), shutter speed, and lens aperture, ideally in manual mode.[6] A depth-of-field calculator can be used to determine the ideal aperture (f-stop) with a specified lens focal length and distance from subject; in a small space, this is likely to be f/10 or above. We have been successful in our setup using a high aperture (f/11), a lower shutter speed (1/100 to 1/125), and an ISO of 200–800. Images were most homogeneous when modifying the ISO variable while keeping the others consistent; thus, ISO should be modified to provide appropriate exposure in each individual environment where lighting and patient Fitzpatrick skin type may vary (Fig. 2).

Consideration of spatial positioning, lighting, and camera settings is key to achieving a consistent image despite variable circumstances. The methods detailed here can be adapted for any office lacking dedicated studio space.

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Author Disclosure Statement

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