EFFECTIVENESS OF COLOR CALIBRATED PHOTO DOCUMENTATION IN THE WOUND CARE CLINIC

If a picture is worth a thousand words, what are your photos saying about your wound care?

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The use of electronic health record (EHR) software is fast becoming the dominant form of medical recordkeeping for wound care practitioners. These EHRs typically store electronic photo documentation of wounds — digital images that are becoming critical for justification of the course of care for reimbursement and proving quality outcomes. The entire basis of payment is shifting toward showing Meaningful Use of a particular treatment. With audits by the Centers for Medicare & Medicaid Services on the rise, wound photo documentation can provide supporting evidence that a particular diagnosis or treatment was medically appropriate. Legal cases involving wound care are relying more heavily on wound photographs to decide the outcome of lawsuits. Even for those providers who aren’t currently taking wound photographs in their clinics, many patients are photo-journaling their own experiences through the use of smartphones, tablets, and other devices (at a certain degree of sophistication, of course). Thus, taking more sophisticated photographs (in which the color is calibrated so that clinicians know they can judge the accuracy and reliability of the photograph being taken) can be a clinic’s best method to represent the excellent work being done onsite daily.

Unfortunately, photo documentation of wounds in a clinic is often performed by a nurse or technician, not a professional photographer. Additionally, most wound photos are taken using consumer-level cameras under variable lighting conditions using unreliable automatic flashes without concrete protocols to achieve any kind of specific standard. As a result, photos often document common photographic errors and inconsistencies rather than the “picture perfect” wound. This means the photos in the medical record are usually relaying erroneous information.

Physicians can be liable for misdiagnosis due to erroneous photo documentation. That said, physicians

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Figure 1.

Photos provided by the author.
but looking at a group of pictures can help providers see differences in wound presentation.

Instead of illustrating the wounds, pictures taken in clinics are often depicting a variety of photography errors. This article will discuss three common photography errors that lead to inaccuracies in wound imagery: 1) inconsistent color; 2) blurry or out-of-focus images; and 3) inconsistent orientation (upside down or sideways images).

ERROR NO. 1: INCONSISTENT COLOR

In Figure 1 on page 20, notice how each skin tone looks different: One is yellow, one is green, and one is too bright and doesn't have much detail. This variety indicates the entire series of photographs is inaccurate. The bottom left photo appears to be normal, however, how do you accurately confirm that it is? Similarly, Figure 2 and Figure 3 (at left) are two images of the same wound. A physician may not have treated the wound in Figure 2 for infection, while the wound photo in Figure 3 would almost certainly prompt the physician to start antibiotics. Looking at Figure 4 (at left, below), one might ask, “Does this patient have a wound?” The answer is, yes, a stage 1 pressure ulcer (Figure 5, at left, below).

ERROR NO. 2: BLURRY, OUT-OF-FOCUS IMAGES

Note: Even when a picture may appear clear when displayed small, it can be out of focus when enlarged for clinical review (Figure 6, below). The need for a means to grade the focus is apparent and currently lacking.

ERROR NO. 3: INCONSISTENT ORIENTATION

These issues (Figure 7, page 22) are critical to all medical photo documentation across the hospital system, especially dermatology, cosmetic surgery, areas of aesthetic medicine, and wound care. The problem is compounded by the
The proliferation of patients photo-documenting themselves, typically with a mobile device with no reference or controls. These images can also be manipulated both intentionally and unintentionally by means of lighting, camera placement, and setting, etc. These photos may completely contradict the course of care prescribed by the clinician. However, if the clinician’s records do not adhere to a calibrated system and a verifiable standard, they are no more reliable than the patient’s smartphone pictures.

**COLOR CALIBRATION OF PHOTOS**

Calibration simply means to bring something to a known standard. The scientific method dictates there must be a known and an unknown in any experiment in order to measure outcome. However, there is no known standard in regards to color and clarity in any common practice of wound care. Most of the instruments in the wound clinic, such as a blood pressure cuff or weight scale, are calibrated, however this is not currently true of the one document that actually depicts the patient — the wound photo in the medical record. The fundamental problem is that photographs cannot be trusted without some form of calibration and system. What are the costs of the lack of calibration and standardization of wound photography? Consider:

- costly inaccuracies in patient treatments resulting from misdiagnosis or failure to recognize deterioration based on the inaccurate sequential wound images;
- insurance authorization or payment denials due to failure to prove medical necessity;
- increased legal liability in wound care-related lawsuits;
- lost referral business resulting from inability to accurately portray the successes of the wound clinic via high-quality photographs; and
- inability to produce quality case studies or case series due to inaccurate, inconsistent photographs.

As more wound care clinics implement EHRs and include wound photography as part of the medical record, establishing a standard protocol for capturing accurate wound images will become a priority for providers to help prove better wound healing outcomes. There is at least one holistic solution to the problems posed in this article. The TRUE-See™ (New Orleans) advanced color calibration system provides for color calibration and focus grading using a patent-pending calibration slate and software. Furthermore, the system modifies currently used cameras to help create consistency in orientation and lighting. The software color calibrates (Figure 8, at left) the photo when it is being uploaded and stamps the photo with a unique certificate with security features that show the ideal colors on the slate, enabling providers the opportunity to judge the accuracy of the photo's color. The software also provides for electronic measurement of the wound on the photo in a way that visually shows how it was measured previously and can be audited.

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**Francis James, a professional cinematographer and co-founder/chief executive officer of TRUE-See, contributed to this article.**