Evolution Technologies for Clinical Photography

From 3D imaging to photo analysis software, new options are available for use in the dermatology clinic.

A Q&A with Joseph Bikowski, MD

Given the visibility of the skin, photodocumentation of cutaneous disorders is a logical undertaking. With developments in imaging technology, clinicians have been able to more easily and affordably incorporate it into practice. The widespread availability of high-quality, low-cost digital cameras makes it easy to capture images for the patient record. Ongoing technological developments are creating even more opportunities for photo capture and image use in the dermatology clinic. Ahead, Joseph Bikowski, MD discusses the role of photography in the dermatology clinic and describes advanced imaging technologies now available to clinicians.

What is the role of photography in the dermatology clinic? What are its limitations?

Standard photography can be extremely useful in the dermatology practice for both medical and cosmetic complaints. The key to successful use of photography is to control for quality and ensure that images are reproducible and can be compared fairly. Factors that influence image quality include correct lighting, proper distance, realistic color reproduction, sharp focus, a proper center of focus, inclusion of a point of reference, and avoidance of distracting elements or backgrounds, Dr. Bikowski says. Photos are suitable for comparison when they are taken at the same angle under identical conditions (such as lighting) and using the same center of focus.

While discussion of photographic documentation is common in the cosmetic arena, it is less frequently addressed in clinical dermatology. However, documenting the patient’s baseline presentation and any subsequent change can be quite helpful for any of the common medical conditions seen by dermatologists, Dr. Bikowski says. “Physicians often say photos are helpful as a patient education or management tool, because patients often forget how they looked before therapy. We should not fool ourselves that we will remember the patient’s initial appearance any better,” he observes. “Good photos offer proof that therapy is either working or needs to be modified.”

Many practices, however, fail to achieve good quality photographs, so measures to improve quality are needed, Dr. Bikowski says.

What is the role of photography in clinical trials?

Photographic documentation has become an essential element of clinical trials for many dermatologic diseases or indications. Blinded review of photographs has been used to quantify the effects of everything from retinoids to dermal fillers. Dr. Bikowski notes. Today, software is used to analyze images and offer objective assessments of therapeutic response, rather than depending on human reviewers. Among software and imaging systems developed for clinical trials are both two-dimensional and three-dimensional imaging systems.

“New imaging systems have been used with specially-designed software to accurately measure objective criteria, such as lesion counts and sizes,” Dr. Bikowski says. “3D imaging and associated software have facilitated the measure of parameters like wrinkle depth that were previously assessed and approximated by comparing before and after 2D images. This obviously left room for error. 3D imaging can also be used to measure change in lesion volume, height, or width, which can be useful to measure the effect of therapy on clinical lesions such as acne lesions or scars.”
How are new technologies being incorporated into clinical photography?

Companies that developed imaging systems and software for clinical trials are now offering their products for clinical use, Dr. Bikowski says. For example, Quantificare’s 2D imaging device DermaViz™ is designed to facilitate consistent imaging without the need for special positioning contraptions. The device uses precisely angled, light pointers on either side of the lens to enable the photographer to “pinpoint” the lesion or anatomic site to be photographed. It is calibrated at a specific distance to ensure that subsequent photos are taken from the same distance with the same visual target. With a fixed distance, camera settings are fixed from one visit to the next to ensure consistency in images over a period of time, Dr. Bikowski suggests, allowing multiple users to take the photographs over time with the same degree of accuracy. 3D imaging can be used in clinical practice to show patients how they may look after a particular treatment or procedure, Dr. Bikowski explains, or to document the outcomes of a procedure or therapeutic trial of medication.

How does 3D imaging work?
The LifeViz™ system uses a compact stereovision camera, which means that it actually captures two images, differing by a few degrees, each time a photo is taken. The two images taken at different angles are then combined to form a single composite image in 3D. “The camera works similar to the human eyes,” Dr. Bikowski says. “We perceive depth because each eye views the same object from a slightly different angle, and our brain merges the data to create a 3-dimensional representation.”

The life-like reconstructions created by the system can then be analyzed by the software to show a change from baseline or simulated to predict a response to treatment. For example, a 3D image can be used prior to injection to show how a hyaluronic acid filler could volumize the lips. Alternatively, after treatment, an analysis of post-treatment and pre-treatment images can help the patient appreciate the degree of volume provided by treatment. Unlike standard photos, which depend to some degree on the viewer’s interpretation of response, 3D analysis quantifies the change in volume, depth and surface area.

What about image storage and retrieval?

Another feature of the Quantificare system is the DermaPix® software for image storage and management. One common complaint Dr. Bikowski says he hears from colleagues in dermatology is that sorting images can be difficult. “Physicians very often have thousands of patient photos stored in various places in and out of their offices,” Dr. Bikowski says. “Images may be stored on several different computers or libraries of disks. There is no single database of images.” Plus, practices frequently lack any standard formatting for file storage and naming. “Generally, the name on the image file differs depending on who took the image and when. Most often, the file is tagged with the patient’s name and date of presentation.”

Even with new EHR systems, file names may not be standardized; Images are often tied to patient records but not necessarily in a larger database, making it difficult to search for images based on a diagnosis or a treatment.

Case-associated file naming and storage is adequate if images are used only for documentation of each case, but it limits the usefulness of images to the physician and practice. “If image names always contained certain specific information and were stored in an organized fashion, they would be more readily identified for case write-ups, presentations, and even practice marketing materials. More importantly, any staff member would be able to identify photos that match specific criteria, and the duty would not fall to one staffer or the physician,” Dr. Bikowski explains. A system that centralizes and standardizes image storage and links images to a patient record is useful, he says. DemaPix software allows for more standard recording and searching of patient images. The software also facilitates side-by-side, on-screen comparison views of images, Dr. Bikowski adds.

What should clinicians consider before investing in systems?

Several companies provide imaging devices and soft-

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ware packages for dermatology practices, Dr. Bikowski points out. Before making a purchase, potential buyers must investigate and compare products. A system that has been validated (Quantificare’s systems are; others may be as well) may be preferred over one that is not. There are costs associated with the size of the image system one chooses and the image storage and organization software, Dr. Bikowski notes. Practices must weigh the potential benefits of any system in light of costs. Practices should consider, however, not just how a system may fit into their current use of images but also how it may expand their use of images.

It is also wise to speak with colleagues about their experiences with any software or hardware and seek recommendations, Dr. Bikowski says. Finally, be sure to determine whether the company will provide training and support.