

Can Mobile Medical Applications Improve the Patient-Provider Experience in the CLI Population?

We know a picture is worth a thousand words; can it be worth a hundred miles as well?

BY JOHN A. PHILLIPS, MD

A few weeks ago, I was at an outreach clinic about 60 miles from our main office and hospital, where we perform the majority of our interventions. I am only there once a month for a dedicated peripheral vascular clinic, often seeing patients with critical limb ischemia (CLI) and venous ulcerations. We have several outreach clinics like this one, attempting to provide exceptional vascular care to some of the smaller rural areas in our region. One particular patient had a nonhealing ischemic heel ulcer with markedly abnormal noninvasive arterial testing results, which were done locally. He was receiving wound care from a local podiatrist, who ordered the ankle-brachial index after the wound healing stalled. The patient and I talked at length about treatment options and the fact that he would need an angiogram and probable intervention back at my practice in Columbus. The conversation then changed from goals of care, wound healing, and preservation of the limb to travel times, distance between patient and provider, and family inconvenience.

This is not a new phenomenon to our practice, as distance between the patient and the provider often becomes the rate-limiting step in the treatment process, often compromising patient care. Inability or unwillingness to travel for procedures or follow-up testing is a major issue that often precludes many of

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our patients from participating in ongoing clinical trials that can advance our treatment knowledge, leading to better outcomes and patient care.

Whether the patient is traveling from their home for a procedure at our main campus (which can be several hours away) or traveling back for postintervention noninvasive testing or follow-up with the provider, the patient and family quickly become tired of the travel. Even though we have multiple outreach clinics that also provide noninvasive testing that are closer to home for the patient, travel time and patient/family inconvenience will always be an issue for many of our patients. This can be particularly arduous for patients with CLI who require very close surveillance—ideally, weekly—that is often not logistically feasible due to travel constraints.

Because of this, I often ask, “Why am I really seeing this CLI patient for follow-up 1 month or 2 weeks post-procedure?” Is it to assess patency success or durability

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of the intervention via noninvasive testing, or is it to monitor the wound healing process? If it is for the latter reason, would an image provide me with the same information, assuming I had something to compare it with? If the wound is healing, then the noninvasive testing may be superfluous; I am more concerned with the wound healing as opposed to patency (particularly with infrapopliteal disease), because the latter drives the former.

Frankly, it is doubtful that we as providers will ever completely eliminate the need for CLI patients to travel for their initial intervention and subsequent follow-up. The fact is that complex endovascular reconstruction is often done at larger tertiary care centers with dedicated CLI teams consisting of multiple specialists caring for these extremely fragile patients. One need not be reminded of the 25% rule in caring for CLI patients, with one-quarter deceased at 1 year. However, I do believe that we can reduce actual patient follow-up and provide some care and counsel through image sharing via telemedicine.

TELEMEDICINE FOR THE CLI PATIENT

Does telemedicine have a role in the CLI population, and would it be possible to provide some follow-up care remotely? Could a relatively simple mobile application on a smartphone eliminate some of the travel tension that occurs during the treatment process for our patients?

The concept of telemedicine is not new. In its infancy, telemedicine provided health care to small rural areas via physical outreach clinics. Since then, telemedicine has burgeoned to include remote video conferencing for patient consultation, virtual patient monitoring, image sharing, and consumer-focused wireless applications. There is even the American Telemedicine Association, which can be found online at www.americantelemed.org.

Telemedicine is very fluid and interactive, requiring buy-in and responsibility from not only providers, but also—and more importantly—from patients. However, I believe that if the patient becomes a more active participant, rather than a passive one, in his or her wound healing process, success is more likely to be achieved.

TABLE 1. SMARTPHONE USE BY AGE

Age Group (y)	% With Smartphone
45–54	70.8
55–64	61.1
≥ 65	46.3

That is the keystone behind our mobile application, myWoundWatch, which allows patients to take photographs of their wounds, send them to their provider with text material, and track the wound healing process by comparing the photos they take.

However, it is not as simple as just creating an application, because this patient population is often elderly and has limited socioeconomic means. There are numerous barriers to the success of an interactive, patient-driven app. These can include patient apathy, lack of insight, or more importantly, lack of the appropriate device: a smartphone. The demographic of patients with peripheral artery disease and CLI tend to be older and less tech savvy. However, the tide may be turning, as recent data suggest that more of the elderly (aged > 70 years) have and use smartphones. Furthermore, younger family members with smartphones who participate in the caregiving process can also bridge the information technology gap between the patient and the provider, allowing for a successful interaction with a mobile medical application.

It has been suggested that one-quarter of the world's population will use a smartphone in 2015,¹ and according to a Nielsen consumer survey in 2014, 71% of Americans had smartphones, equaling over 171.5 million people. Nielsen also reported that nearly one-third of United States smartphone owners—about 46 million unique users—accessed mobile applications in the fitness and health category in January 2014, an 18% increase in users compared with the same month a year earlier.² Research2guidance, a market research company focusing on the global app economy, estimated that 500 million smartphone users will be using a health care application this year and projected that by 2018, one-half of all smartphone users will be using one.^{3,4}

When looking at smartphone use within the patient population that develops peripheral artery disease, 46.3% of individuals 65 and older have a smartphone (Table 1).² I was recently visiting a large retirement community in central Florida, where I was quite surprised by the number of elderly people actively using their smartphones, often with more apps than me or my children.

More providers are using health care apps, as well. In 2013, the Healthcare Information and Management

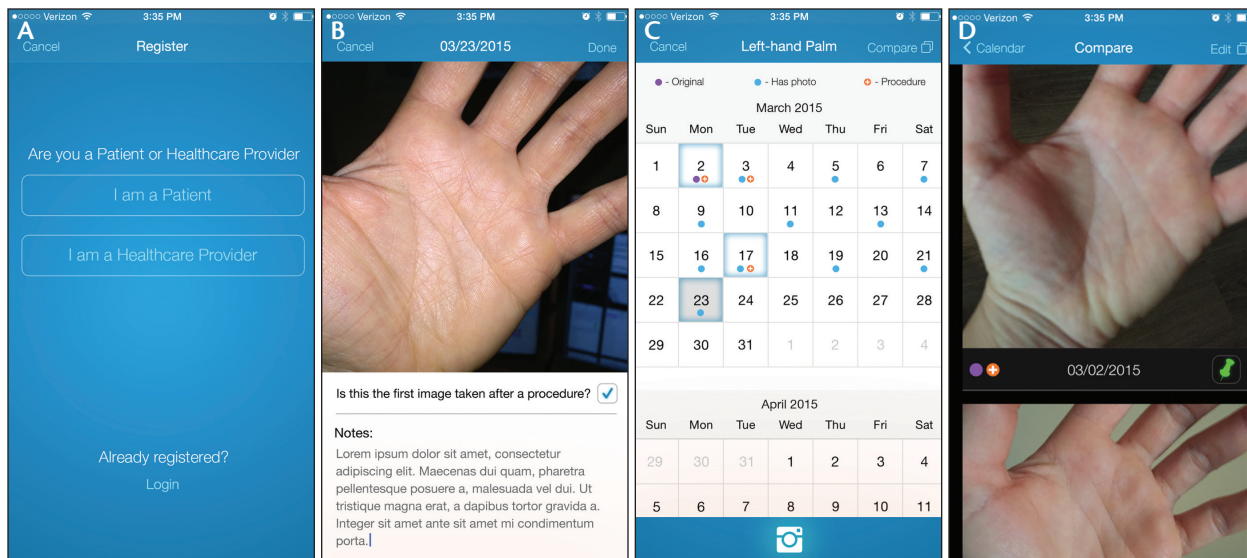


Figure 1. Patients and providers register for the app (A), and wound images can be input with notes (B). The wound watch calendar (C) shows dates of photos and procedures and allows selection of photos for image comparison (D) so that patients and providers can track the progress of wound healing.

Systems Society (HIMSS) released a study reporting increased usage of mobile devices in hospitals and health care systems. In 2012, 34% of clinicians were using a mobile device to monitor patient data, an increase of 30% from 2011.⁵ One can only expect those numbers to continue to increase as more mobile health care apps are developed, specifically those that are both HIPAA compliant and user friendly.

In an attempt to improve our patient care, potentially reduce follow-up office visits, and empower both patients and providers with the ability to easily track the wound healing process after treatment, I am developing a HIPAA-compliant mobile medical application, myWoundWatch. After downloading the application and creating an account, the patient can take a photograph of his or her wound and upload it to a calendar that allows for comparison of images (Figure 1). Their provider can download the app and track the patient's wound(s) as well, once the individual patient has granted access to the provider in the directory. This ultimately allows for secure image sharing between the patient and provider or multiple providers.

We are in the initial stages of developing a pilot program to assess the functionality of the app for reducing patient follow-up visits and improving wound healing times, thereby providing better patient care with potential cost savings.

Maryland-based Accella, the company that is helping develop myWoundWatch, is a digital agency focused on the design and development of data-driven websites

and interactive mobile applications. This particular company has found a niche developing mobile applications for the medical community. They are recognized as experts in the field and have spoken on panels and published articles related to FDA guidance on mobile medical devices as it pertains to smartphone applications. I quickly realized when developing the app that it is paramount that the development company you work with is well versed in HIPAA compliance and data security. At the bare minimum, your app must have the capabilities for properly storing and protecting the secure, identifiable patient information that is collected and used for patient care.

The free app will be available this June for download at the Apple Store, and we hope to create the app for the Android OS in the coming months. ■

John A. Phillips, MD, is with OhioHealth Heart & Vascular Physicians in Columbus, Ohio, and is the developer and founder of MyWoundWatch. He has stated that he has no financial conflicts regarding this article. Dr. Phillips may be reached at john.phillips2@ohiohealth.com.

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