PANEL DISCUSSION

# Lower Limb Postrevascularization Amputation Prevention

Perspectives on outcomes for endovascular versus open repair, hallmarks of amputation prevention, the importance of multispecialty collaboration, standards in wound care, and more.

**With David G. Armstrong, DPM, MD, PhD, and Caroline Fife, MD**

**David G. Armstrong, DPM, MD, PhD**
Professor of Surgery and Neurological Surgery
Keck School of Medicine
University of Southern California
Los Angeles, California
armstrong.dg@gmail.com

**Caroline Fife, MD**
Professor of Geriatrics
Baylor College of Medicine
Houston, Texas
Chief Medical Officer
Intellicure, LLC
The Woodlands, Texas
cfife@intellicure.com

**For patients who undergo revascularization of any kind but ultimately still go on to have an amputation, what are some factors commonly associated with their postprocedural course specifically?**

**Dr. Armstrong:** People with diabetic foot ulcers and severe chronic limb-threatening ischemia are at high risk for amputation. The good news is that nowadays, high-level amputations are less common when patients are treated in interdisciplinary limb preservation units.[1] Close communication between podiatric and vascular specialists is easy to talk about on paper but is hard to do in real life. However, just because it's hard to do doesn't mean it isn't enjoyable or even life-affirming. It's both of those things.

**Dr. Fife:** There is a distinction between major and minor amputations. Major amputation does not happen often, but if it does, it is usually because either the revascularization was not successful or there was too much tissue loss to save the limb.

We consider toe amputations to be minor and to be a "win" in some cases because the patient still has bipedal gait. There are many times we know they will lose toes, but the goal of the revascularization is to save the leg. That's a win, not a loss.

**What differences have been observed in factors leading to amputation in patients undergoing endovascular repairs versus those seen in patients who've had open repair, if any? How can these be better understood to properly tailor and follow patients based on their index procedure?**

**Dr. Fife:** Regarding whether there are factors associated with amputation that are specific to open procedures, I do not know for sure, except that open procedures often leave nonhealing surgical wounds from the revascularization itself, and that is a bad sign.

**Dr. Armstrong:** This is really about timing. We tend to be more expeditious with our postintervention podiatric reconstruction after endovascular intervention, and we tend to wait a bit longer after open repair. The theory is that we might allow the open procedure to mature a bit more. This is also true for deep vein arterializations, which are becoming more and more common in units worldwide.

### Much attention is focused on the affected limb. What should be done to avoid problems from occurring in the other leg?

**Dr. Armstrong:** We can't take our eye off the ball (of the foot) so to speak! Remarkably, more than half of recurrences in our patients in diabetic foot remission will occur on the contralateral limb. Keying in on protecting that foot with good quality footwear and frequent podiatric care is the order of the day.

**Dr. Fife:** The most effective interventions are systemic (diet, exercise, blood pressure control, smoking cessation, etc). These work on both limbs. Perhaps even more importantly, we need to monitor the heart. Most patients with peripheral artery disease have cardiac disease and that's what will kill them if it gets missed.

### Perhaps most importantly, what are some of the hallmarks of postrevascularization care to prevent amputation? Do these differ based on the means of revascularization?

**Dr. Armstrong:** Communication is key. I think that many podiatrists believe that once their vascular colleague has performed their endo or open "wizardry" that the box is ticked, and the repair is somehow immortal. Unfortunately, all of us clinicians know the adage that "nothing ruins a good surgical result like follow-up." Ultimately, if the patient lives long enough, as we hope they do, then the repair will likely go down. The clock is always ticking. I would urge my vascular colleagues to communicate this with their podiatric surgical and primary care colleagues. In fact, our unit has implemented "remission" clinics to make sure that our patients are getting their postwound and postintervention care. These are managed by a multidisciplinary team led by podiatry (prosthetics, dietitians, physical therapists, etc). The goal is to maximize ulcer-free, ischemia-free, hospital-free, and activity-rich days for our patients.

### What is your advice for lower limb vascular specialists who want to improve their understanding of developing collaborative working relationships with podiatry and wound care colleagues to ensure optimal outcomes?

**Dr. Fife:** I am devoted to the vascular interventionalists who take my phone call and get patients into the cath lab immediately. If the interventionalist is good at what they do and sees patients fast when they need it, then we will have a great collaborative relationship. Handling cases efficiently and giving me follow-up is key. In my experience, the biggest problems arise when the interventionalists do not communicate with the referring doctor to tell them what disease they found, whether the procedure was successful, and what other interventions or follow-up are needed.

**Dr. Armstrong:** Find your BFF (best foot friend). In fact, the American Limb Preservation Society (limbpreservationsociety.org) was established just for this purpose. It is (if you will) like a dating app and marriage counselor for clinicians who care about this field.

### With many different approaches in use for wound management, is some degree of standardization necessary? If so, what can or should be done to standardize wound care?

**Dr. Armstrong:** The good news here is that standardized "best practices" are becoming less variable. The International Working Group on the Diabetic Foot, the American Diabetes Association, and the Wound Healing Society all have good quality guidance in this area. These serve as something of a roadmap. The clinician may always, to personalize care, go "off road" if you will, but she or he knows their way back on.

**Dr. Fife:** Support the reporting of available wound care relevant quality measures (note that arterial screening is one of them) and develop new wound care quality measures. There are standards in wound care,[2] they just aren't implemented well. But, what are we to expect when there is almost no formal training in wound management and it's not a recognized subspecialty? ■

1. Armstrong DG, Tan T-W, Boulton AJM, Bus SA. Diabetic foot ulcers: a review. JAMA. 2023; 330:62-75. doi: 10.1001/jama.2023.10578
2. US Wound Registry. US Podiatry Registry. Quality measures: provided by the US Wound & Podiatry Registries, developed with clinical associations. Accessed March 21, 2024. https://uswoundregistry.com/quality-measures/

*Disclosures*
*Dr. Armstrong: None.*
*Dr. Fife: None.*