

**Melanie Cole (Host):** Welcome to the podcast series from the specialists at Penn Medicine. I'm Melanie Cole. And today, we're discussing the Limb Preservation Program at Penn Medicine. Joining me is Dr. Julia Glaser. She's a vascular surgeon and an Assistant Professor of Clinical Surgery at Penn Medicine. Dr. Glaser, it's a pleasure to have you with us today. As we get into this topic, can you tell us a little bit about the current state of diabetes and how the lower extremity amputation is an unfortunate and often avoidable sequelae of complicated diabetes? Tell us a little bit about critical limb ischemia and who it affects.

**Dr. Julia Glaser:** Sure. And thanks so much for having me today. This is a really important topic and I think affects a lot of people across the country and particularly a lot of people in Philadelphia, which is why it's so important to get the word out there about the conditions that lead to this, and also what we're doing here at Penn to prevent amputation.

You're absolutely right. People who have particularly poorly controlled diabetes for a long time can have peripheral vascular disease. Essentially, high blood sugar, over a long period of time damages the blood vessels, both large blood vessels, as well as small blood vessels. That can make people more likely to develop wounds. And at the same time, the damage to the blood vessels prevents enough blood flow from getting to the wounds to help people heal them.

Critical limb ischemia means the end stages of what's known as peripheral arterial disease. Peripheral arterial disease refers to blockages in the blood vessels. It tends to affect smokers. It affects men more often than women. And it also affects people with end-stage renal disease, especially folks on dialysis and people with diabetes. Diabetes and PAD, as we call it, are linked pretty tightly. Critical limb ischemia affects people with poorly controlled diabetes and can lead to amputation. And that's really why we put this program together to help prevent amputation in these folks who are unfortunately susceptible to these complications.

**Host:** Well, then, Dr. Glaser, can you describe a little bit about your background and the role of vascular surgery in critical limb ischemia treatment?

**Dr. Julia Glaser:** I'm vascular surgeon, so I provide both open and endovascular treatment for peripheral arterial disease, everything from a traditional open femoral to distal bypass operation, everything from that, all the way to on the other end of the spectrum, minimally invasive endovascular

techniques using the latest technology in stenting, drug-coated stenting, angioplasty, atherectomy, all those sorts of things.

Really, the goal from the vascular surgery standpoint is to improve the perfusion of people's feet, because that's often one of the issues in these folks. The poorly controlled diabetes or poorly controlled hyperlipidemia or hypertension leads to peripheral arterial disease, and then sets folks up for amputation. So my role here is to bring more blood flow to people's feet. And it's really important in critical limb ischemia to have that as part of everything that these folks need. In addition to my work, they often need treatment from other folks who we have on the team here at Penn Medicine.

**Host:** Well, thank you for that. And as we're talking about what's new in the treatment of critical limb ischemia, tell us a little bit about the evolution of limb preservation and the rationale for preserving limb function. Tell us just briefly about the standard treatment and how that's evolved over the years.

**Dr. Julia Glaser:** Yeah. Well, historically, standard treatment was open bypass and the trouble with open bypass was that if your heart wasn't working well or lungs you weren't really a candidate for open bypass. And so, endovascular treatment has allowed us to do a lot more for a whole lot more people. It's allowed us to improve perfusion in a whole lot more people who traditionally wouldn't have been candidates for open bypass.

And if you look at data across the country, meta-analyses have shown that the rate of open bypass has gone down while the rate of endovascular interventions has gone up and that's actually been associated with a decrease in the number of amputations if you look across the country. We haven't quite seen this effect in diabetics just yet. And I think our techniques are continuing to advance as we tackle tibial disease, which is primarily the site of peripheral vascular disease in folks with diabetes and critical limb ischemia. And vascular surgeons have been involved in the whole spectrum from when things are open bypass, now most vascular surgeons, including myself, do open bypass as well as endovascular therapy.

**Host:** The affected population for this, for critical limb, is really clinically diverse. Does this present issues with coordination of care?

**Dr. Julia Glaser:** It can make it a whole lot harder for patients to get the appropriate treatment that they need. These are often patients who need not just me, but they also need wound care. They may need podiatry. Sometimes they need help from endocrinology. Sometimes they need help from infectious

disease. So what we've put together with PALP is really a multidisciplinary program in an attempt to make it easy for patients to get everything they need from the fewest number of clinic visits possible to sort of take out the barriers of, "Oh, you're seeing a vascular surgeon" then, "Oh, you need to go somewhere separate to see a podiatrist," and then, "Oh, you need to go a third place to see an endocrinologist." We're trying to get rid of all those barriers so that people can get care in a more timely manner.

**Host:** And that's certainly a great mission as you're telling us about the Penn Advanced Limb Preservation Program or PALP and the primary mission of this program. Tell us how this care model will improve the way patients receive their care. You just mentioned it a bit. Expand just a little bit on that and really how you're utilizing multidisciplinary teams, why that's so important for this condition.

**Dr. Julia Glaser:** Of course, what we're doing is we've set up clinics where there are people from multiple different specialties under one roof. So that if a patient comes in to see me, there's a podiatrist down the hall. So instead of the patient having to go make another appointment, schedule it on a different day, I can poke my head into the podiatrist's office and say, "Hey, would you mind taking a look at this patient that I'm seeing for critical limb ischemia?" Really removing the barriers. We're onsite with hyperbarics, as well, for patients who qualify with that. I have ways to get people into expedited appointments for endocrinology and for infectious disease. So that really the care is coordinated. We're all talking together. We have a multidisciplinary limb salvage conference where we talk about different patient cases and different ways that we can approach things.

The program includes people from all different sorts of specialties, like cardiology, interventional radiology. So we get perspectives on how to do things from multiple different practice backgrounds. And the goal is really to provide the best care for patients in the most coordinated manner. We know that in these patients, time is of the essence in terms of making sure that there aren't delays in them getting to podiatry or infectious disease or whatnot.

So trying to house everybody under one roof to the extent that we can is the first step, and then having expedited appointments to those folks who aren't in clinic with us.

**Host:** Speak a little bit for us about patient selection for these types of procedures. And can you describe a typical patient's journey at the program?

**Dr. Julia Glaser:** Most patients can have some sort of endovascular procedure to at least determine if there's something that we can do in terms of blood flow. Things that traditionally were limitations like chronic kidney disease or heart failure or coronary disease are limitations that don't really exist anymore. We've advanced in terms of our techniques such that we can offer most people something.

And then a typical patient journey is that once they come into the clinic, they're seen often by a vascular surgeon first or potentially by a podiatrist first and we'll determine what they need. If there's somebody who needs revascularization work, we get them in to see the vascular lab and determine exactly what their options are from a perfusion standpoint. We'll work with them from the podiatry side to determine what they may need in terms of podiatric surgery, whether that's debridement or different wound care. We'll work with them and get them into endocrinology if they have poorly controlled diabetes and that's a component of it. And so people come through the door and we meet them where they are and we sort out what they need. And we attempt to get that to them or deliver that care to them in the most efficacious and expedited manner that we can.

**Host:** What would you like to tell referring physicians, Dr. Glaser, about the Penn Advanced Limb Preservation Program and when you feel it's important they refer.

**Dr. Julia Glaser:** Any physician who is concerned about their patient having critical limb ischemia should have a really low threshold to send them to see us. We're happy to delve into all of the intricacies of their care and help them get sorted out. I think we exist because we want to prevent amputation. And I think there's no such thing as a referral that's too early for folks. Even if people don't have a wound, but they just need surveillance in terms of some of their conditions, we're happy to set them up for that to achieve our overall goal of fewer people getting amputations in the Philadelphia area.

**Host:** Thank you so much, Dr. Glaser, for joining us today and telling us about the Penn Advanced Limb Preservation Program. To refer your patient to Dr. Glaser at Penn Medicine, please call our 24/7 provider only line at 877-937-7366 or 877-937-PENN. Or you can also submit your referral via our secure online referral form by visiting our website at [pennmedicine.org/referyourpatient](http://pennmedicine.org/referyourpatient).

That concludes this episode from the specialists at Penn Medicine. For updates on the latest medical advancements, breakthroughs and research, please follow us on your social channels. I'm Melanie Cole.