

**Melanie Cole, MS (Host):** Welcome to the podcast series from the specialists at Penn Medicine. I'm Melanie Cole, and joining me today is Dr. Lorraine Boakye. She's the Director of Clinical Research, Foot and Ankle Division and Assistant Professor in the Department of Orthopaedic Surgery at Penn Medicine. She's here to highlight tendinopathy and rupture for us today.

Dr. Boakye, thank you so much for being with us. I'd like you to start by providing a little background on your role as an orthopaedic surgeon at Penn Medicine and an overview of what we're discussing here today.

**Lorraine Boakye, MD:** Absolutely. Well, thank you so much for having me. Again, my name is Lorraine Boakye, I'm an Assistant Professor in the Department of Orthopaedic Surgery at Penn Medicine. My subspecialty training is in foot and ankle surgery. I also serve as the Director for Clinical Research within our division, and we'll be talking about Achilles rupture and tendinopathy.

**Host:** How prevalent is this?

**Lorraine Boakye, MD:** Well, it's one of the most common injury complexes, whether it's the actual instance of rupture or tendinopathy. But it's among one of the most common, acute on chronic things that we face at least as foot and ankle physicians.

**Host:** Dr. Boakye, can you speak a little bit about some of the most common causes that you see and even in the acute process, and differentiate for us about chronic overuse versus acute for these injuries?

**Lorraine Boakye, MD:** Absolutely. When we think about it, we sort of wonder what makes a tendon more prone to rupture, or some sort of acute-on-chronic either inflammatory or degenerative process that ends up causing people significant pain and functional limitation. And the reasons for this are pretty multifactorial. And in fact, that's one of the things that many folks within our realm are sorting out in terms of what they think is maybe the most compelling of the causes. But certainly among those, we see it more frequently in men, typically thirties, forties, fifties range. But really no group is immune to either pathology and it's usually some sort of injury caused by overuse. Whether it's repetitive activity or a sudden increase in activity from a relatively sedentary sort of lifestyle. And it's usually, in cases of rupture, at a site that is a few centimeters above the insertion of the Achilles tendon, where it's known to be what's called a watershed region, where the actual vascular supply to this area is lessened.

So we think that on sort of a mechanical level as well, this sort of spot is predisposed just because of the amount of relative blood flow restriction compared to other portions of the tendon. And when we think about tendinopathy, there is both insertional and non-insertional. And when we think about the factors that cause the tendon to be inflamed or irritated, right as it inserts onto the calcaneus, we think about whether there are external factors, like a certain shoe wear or other gear for certain athletic activities, or if there is a bony prominence called the Haglunds, which is a little extra bit of bone posterior-superior aspect of the calcaneus that kind of predisposes the tendon to more friction and impingement. And so, we think about really on sort of a cellular level that the potential histologic impact of what the actual tendon may look like, but then also what are the lifestyle and comorbidity factors that may influence this. So whether it's diabetes or rheumatoid arthritis, or end-stage renal disease or other factors that may cause a tendon to have less blood supply or less nutrient supply, that may cause ultimate injury or rupture.

**Host:** So, I'd like you to speak about treatment options and what you're offering for patients with Achilles tendinopathy and/or rupture.

**Lorraine Boakye, MD:** When thinking about management for rupture, there are essentially two camps of non-operative and operative management.

And ultimately when we're thinking about who may do well with surgery, we have to think about the overall picture of health and sort of what their goals are in terms of functional level of activity. And the real kind of take homes are trying to figure out when it is safe to operate, especially in these cases where the patient is prone, we want to make sure that the anesthesia risk isn't undue. But sort of outside of that, the goals of surgery for rupture are to essentially approximate the tendon ends and make sure that we're able to take the rupture site and physically put it back together and make sure that it is at a reasonable resting length in tension. And that gives us the best chance of kind of expediting or optimizing healing.

And we started to think, all things being equal, what are the sort of advantages of surgery? And as far as studies go, we've sort of seen that ideally, it gives us a bit of a faster recovery, meaning you cut down some of the weeks that you are actually within our treatment paradigms, and potentially giving people earlier range of motion, so preventing a bit of stiffness because you're able to progress through the range of motion and strength and rehabilitation protocol a little more quickly. There's some thought that there is a lower risk of re-rupture. Recent literature has maybe refuted this, but I think anecdotally, many of us still favor having a lower risk of re-rupture with operative management.

In terms of non-operative management, if the patient either can't or does not elect to undergo surgery and we think there's a reasonable risk of them healing, if it's an acute rupture, in those cases, if there isn't a big risk of kind of interposed fat or degenerative tissue, or a really large amount of retraction; then the hallmark is really putting someone in a position of kind of best healing, and that's with planter flexion. We have modalities where we put people in resting planter flexion splints, and essentially have them or advise them to be non-weightbearing for the first two weeks.

And then essentially in both post-op protocol and the non-operative protocols, we sort of systematically advance people through non-weightbearing with protected weightbearing, and then up through weightbearing with just a boot, and then eventually kind of switching into a regular shoe with a heel lift. And this is alongside physical therapy or functional rehab for both.

**Host:** Well, when you're speaking about patient selection, what would make a patient decide no or yes, in this shared decision making that you're doing with patients? Tell us a little bit about selection.

**Lorraine Boakye, MD:** Absolutely. I think that's a really big part of specifically this treatment paradigm for rupture in that, if we are able to say that all things being equal, the two treatment protocols are about the same, then folks that either can't undergo surgery due to kind of life restrictions or plans, and those sorts of logistic barriers or actual health concerns, whether it's cardiac or pulmonary issues, or even things that are sort of chronic, not active medical problems, but may cause someone to have a higher risk for wound healing issues or infection, such as diabetes or vascular disease, or patients that are long-term smokers. That's a case where we start to think about what the risks of actual operative management are and how those may be impacted by their overall disease state.

**Host:** Dr. Boakye, please speak to other providers, coaches, trainers, people out there that would refer to you, why are they sending patients to an orthopaedic foot and ankle surgeon for this condition? And when do you feel that it's important that they refer?

**Lorraine Boakye, MD:** I think in terms of rupture, it's most commonly handled by foot and ankle orthopaedic surgeons. And as you know, these are folks that have done four years of med school, five years of residency, and an additional year of subspecialty training. And so, by volume we see a lot of this and we're able to kind of contextualize the treatment paradigms, both within the context of

the comorbidities as a patient, but then also the relative biomechanics of their specific lower extremity.

In the cases of tendinopathy, I think it sort of depends on how comfortable people are with managing sort of the initial steps of care. And typically it's physical therapy, alteration to shoe wear, potentially even bracing, and really a sort of panoply of non-operative modalities. And because the Achilles tendon is a more common pathology; it may be sort of within other folks' wheelhouse, but we're happy to be involved on the sooner end so that we can sort of sway how care progresses, and kind of figure out when, and if, someone does need to go onto surgery for a tendinopathy.

And as far as rupture, in terms of referral, we've seen that folks may feel like they want to have a full diagnostic picture before they send them over to us. But that may actually cause a delay, you know, if they're getting ancillary testing that takes a bit to schedule or to result. And so if there's really any concern in terms of the clinical presentation, or even the history that a patient has, we're happy to have those patients come to our office sooner than later so that we can examine them, and make sure they get care as soon as safely possible.

**Host:** What's exciting in your field, Dr. Boakye, in this field specifically, but anything in orthopaedic surgery? What really excites you on the horizon?

**Lorraine Boakye, MD:** I think really in orthopaedic surgery we've come a long way in terms of really getting our research to be on the same level as other subspecialties in so far as using randomized control trials and kind of pushing the envelope with the level of evidence that we're able to bring to the table, and have these findings actually change healthcare and change the way that we practice. So a lot of the work that we're doing here at Penn, in conjunction with the McKay Lab – our basic science colleagues and PhDs in the orthopaedic surgery department here – we're really looking to optimize essentially every avenue of care, specifically for the Achilles. That's kind of our big interest: figuring out, you know, when is the soonest that we can get people safely back in walking and returning to sport, like after an Achilles rupture repair surgery.

So working to figure out how much a tendon is actually being loaded and using machine learning algorithms to figure out how much data we need to get from these very cool new sensors where we can attach them to a boot and have someone walk around and get a sense of their specific loading profile, their walking speed, other biomechanics that are helpful in sort of giving objective data, about how they're healing.

So the more that we're able to glean, how a patient is doing, whether it's objective data from these new sort of gizmos that we were able to optimize to help us better understand patients, or even implementing patient reported outcomes, which are a bunch of surveys that patients are able to sort of self-reflect on their disease state and tell us sort of how they're feeling, in the context of their everyday life, is honestly really helpful in terms of really driving evidence-based medicine, and sort of being on par with other subspecialties that way.

**Host:** Well, return to play is certainly a topic in its own, and I want to hear more about those cool sensors. So you'll have to come and join us again and tell us about some of those exciting technology in your field. As we wrap up, I'd like you to speak to other providers. Tell them what you would like the key takeaways to be. Anything you'd like to mention as far as Achilles tendinopathy and/or rupture and why it's so important to refer to the specialists at Penn Medicine.

**Lorraine Boakye, MD:** This is an area of specific interest for us at Penn Medicine in the foot and ankle division. And so we're sort of on the forefront of all of the new literature and surgical advances and all of the new devices that we can use to really optimize care. So if there's anything I'd take away from this, it's that, you know, if there's any suspicion of an Achilles rupture, I would tell them no weightbearing. Give them some crutches or a walker or a knee scooter or whatever gets them safely around, and send them our way. And in terms of tendinopathy, that is a longer process, but certainly we want to mitigate any potential risk factors for eventual rupture. These are more attritional. So in that case, you know, if it's been some time and a patient is still having symptoms, we're certainly happy to see them so that we can try to optimize them with whatever we have in our arsenal.

**Host:** Thank you so much Dr. Boakye for joining us and sharing your incredible expertise in this area. To refer your patient to Dr. Boakye at Penn Medicine, please call our 24/7 provider only line at 877-937-PENN, or you can submit your referral via our secure online referral form by visiting our website at [pennmedicine.org/referyourpatient](https://pennmedicine.org/referyourpatient). That concludes this episode from the specialists at Penn Medicine. Please always remember to subscribe, rate, and review this podcast and all the other Penn Medicine podcasts. I'm Melanie Cole. Thanks so much for joining us today.