

Melanie Cole, MS (Host): Welcome to the podcast series from the specialists at Penn Medicine. I'm Melanie Cole. And today, we're highlighting commonly missed orthopaedic trauma injuries with Dr. Samir Mehta. He's the Chief of the Division of Orthopaedic Trauma and Fracture Care at Penn Medicine.

Dr. Mehta, it's a pleasure to have you with us. Can you first provide a little background on your role and an overview of what we're going to be speaking about today? How common are missed ortho traumas?

Dr. Samir Mehta: Thank you for having me be a part of this. My role at Penn is to take care of patients who've had traumatic injuries. And I think one of the things that people hear about our specialty, they think car accidents and falls from heights and big traumas and big injuries. But a lot of times, most of the injuries that I'm taking care of are weekend warriors who happen to just slide to third base wrong or somebody who falls off their bike, training for a triathlon. And so, they're not these expansive, aggressive injuries, but I call them run-of-the-mill, every day, day-to-day injuries that your neighbor might have or you might have. And so, that's a lot of the injuries or the trauma that we take care of.

Unfortunately, orthopaedic injuries are very, very common. Musculoskeletal trauma, musculoskeletal injury is one of the most common things that people have and happens to almost everybody in their life at some point or another. And because of that, a lot of different people will see individuals who have suffered or sustained some kind of an orthopaedic musculoskeletal injury. This can be an urgent care, it can be a primary care doctor, it can be a primary care physician, it can be a nurse practitioner, it can be an emergency room, it can be an athletic trainer. And so, there's lots of different people who are evaluating and seeing patients for the first time who have musculoskeletal complaints.

As a result, I think what we sometimes see in our outpatient clinics and in our emergency rooms are the sequelae of injuries that may not be top of mind to somebody who doesn't do this on a day-to-day basis. And these are injuries like stress fractures of the lower extremity, like the tibia or the femoral neck, which can be catastrophic if they're missed; things like Lisfranc injuries of the foot; ankle fractures, which sometimes can be overdiagnosed or underdiagnosed and I'll talk about that; and then, situations where patients have nonunions or delayed unions where fractures don't heal or an underlying infection that's sort of brewing and that, again, is not top of mind to the person who's seeing the patient.

Melanie Cole, MS: Well, thank you for that. So Dr. Mehta, let's talk about those most common, the ones that you just listed that are either missed,

misdiagnosed or operated on when they shouldn't be. And why these are so often missed. And while you're telling us about that, I'd like you to speak a little bit about the proper diagnosis and treatment modalities for these missed traumas. So, why don't we start with stress fractures?

Dr. Samir Mehta: So, stress fractures are really common in typically overuse situations. So, these are not just the athletes who are training for sport at college or beyond college, but stress fractures happen to all of us if we are getting ready for a race or getting ready for an event. The most common event here in Philadelphia that I often see is our Broad Street Run, which is a 10-mile run in the city. It's just long enough that people have to train for it, but not so long that not everybody thinks they can do it. So, we get a lot of people who are training for the Broad Street and they sometimes undertrain or aggressively train and they end up with stress reactions or stress fractures.

Stress fractures can happen anywhere in the body due to overuse. The areas that are very concerning are when you have a stress fracture of your tibia, which is the shin bone, or a stress fracture of your femoral neck, which is the top of the femur bone or what we'd consider the hip area. The reason these are concerning is because if a patient has a stress fracture and it's ignored or undertreated, meaning they're allowed to continue their impact activity, they can actually sustain a fracture of that limb and that's catastrophic, especially a femoral neck fracture in a young patient.

And patients will often say that my hip hurts or my groin hurts, and oftentimes these are diagnosed as a muscle strain or a muscle pull. And I can assure you that I have seen patients who've had femoral neck stress fractures that have completed the fracture. So, imagine the ice cream falling off the ice cream cone, and it is a significant problem and catastrophic problem in a young person. And so when there are patients who complain of groin pain who are aggressive or very active or maybe are not resting appropriately or patients who complain of shin pain who are overtraining, one of the things I strongly encourage is for patients to get an MRI of their hip or an MRI of their tibia to make sure that there's no stress fracture or stress reaction.

The solution to this, depending on how involved or extensive it is, starts off with simply take the load off, so it's non-weight bearing on that limb until you can get to a specialist who can then help facilitate whether this is something that requires surgery or something that can be treated non-operatively with just time and some TLC and staying off the limb to get it to heal properly.

Melanie Cole, MS: This is such great information for other providers. And as you said, Dr. Mehta, that many providers see these kinds of orthopaedic injuries; coaches, athletic trainers, whoever see them. So, they are easy to miss and you're just giving such great information. So now, why don't you talk about Lisfranc injuries?

Dr. Samir Mehta: So, Lisfranc injuries are a fairly unique and not common injury, but they are one of the most commonly missed injuries of the foot and ankle. Lisfranc injuries are catastrophic. If any of you who follow professional sports, you'll hear a lot of athletes will get Lisfranc injuries. And for them, it can be a career-defining, career-ending injury. But Lisfrancs happen in non-athletes as well. Typically, patients will say they sprained their ankle or they rolled their foot, and it is treated as such. And they're often missed because the foot is swollen, it's painful and that's what happens when you have an ankle sprain or a foot sprain.

But what these patients will typically speak of is they have a distinct inability to put weight on their foot. It's exquisitely painful to stand on their foot. They'll have really, really significant swelling, more so than you would actually expect for an ankle sprain. And their foot is exquisitely tender in the midfoot area, both on the top and the bottom of the foot. And you have to have a low threshold when you're thinking about a Lisfranc injury. It's the ligamentous and bony complex that makes up the arch of the foot. And it's immensely critical to the ability to bear weight. And if it's missed and it goes on for too long, it's a bit of a problem to reconstruct. And so, that's why these Lisfranc injuries are so common. They're often missed because people just think of them as an ankle sprain, but the patient will typically describe a rollover mechanism where they kind of rolled over their foot. I've had a patient, I've had multiple patients, but I can think of one where they got it from slamming on the brakes too hard, right? They pushed so hard on the brakes that they gave themselves a Lisfranc injury.

Melanie Cole, MS: Wow. That's so interesting and not something that every provider comes across. Now, what about ankle fractures? This is pretty common, but tell us why this is so easily misdiagnosed or missed.

Dr. Samir Mehta: So, ankle fractures are the other spectrum compared to Lisfranc. So, Lisfranc injuries are not common and ankle fractures are very common, but ankle fractures come in two varieties. You know, when I talk to patients about ankle fractures, they can be stable or unstable, and a lot of patients don't understand how they can have a break, but be stable. And the analogy I use is I can drop a dish on the ground. I can have a nice crack in the dish, but structurally the dish is stable. I can put it in the cupboard. I could wash

it. I could put it in a pile. And as long as I don't drop it on the ground again, it works just fine. And so similarly, we see ankle fractures in patients and some patients are made strict non-weight bearing for six weeks or eight weeks or twelve weeks when they had a stable ankle fracture and they could have been walking on it week two, week one, right? And that actually, they do worse by keeping them non-weight bearing than had they been walking immediately.

And so, one of the things that is important about ankle fractures is making sure that they had a stress X-ray of their ankle so that we can determine, is it an unstable fracture that then requires surgery? Or is it a stable fracture that the patient could be made almost immediately weightbearing, saving them from the trouble of having to be non-weightbearing for six to eight weeks? If anybody who's listening to this podcast has ever heard of or had to be non-weightbearing for any prolonged period of time, it's really challenging. And imagine if you're older, having to use crutches or a walker when you don't really need to. So, that's where sometimes we can overdiagnose ankle fractures and maybe be too conservative with them. And in the orthopaedic world, we've come around to realize that not all ankle fractures need to be immobilized and need to be non-weight bearing.

Melanie Cole, MS: So, talk about nonunions and delayed unions and why this is something of concern to orthopaedic surgeons.

Dr. Samir Mehta: Yeah. So, nonunions and delayed unions are not common either. I see them a lot in my practice because of our referral practice. But most fractures want to heal. Nature wants our bones to heal. The nonunion rate, which means bones don't heal, is about 10-15%. Certain bones are more at risk than others. The tibia bone is a good example because it's got a poor blood supply, the femoral neck in a young person because of the deforming forces on it, these are just examples of bones that are at higher risk. The femur bone or the thigh bone is at lower risk. It's got a great blood supply.

When patients have an injury and sometimes surgery, they may go on for a period of time where they're not healing or they're healing very slowly. And this can then lead to a nonunion. It's hard to sometimes diagnose a nonunion because you assume everything is going fine. You know, you had a trauma, you had surgery, of course, it's going to hurt, but most fractures should heal. And if there's a delay in healing, it can then lead to complications like broken hardware, deformity, which then makes the reconstruction that more challenging.

So, there has to be an awareness that, "Hey, yeah, this was a bad trauma. This was a bad injury. But now it's been three months, six months, nine months, and I'm still not united. The bone isn't healed." And eventually, the problem is that all hardware will eventually fail, right? Think of the hardware that we put into people like a paperclip. And over time, as you walk on it or load it, that paperclip bends back and forth. Eventually, every paperclip will break if you bend it back and forth enough. The metal is the same way. This metal will all eventually fail. The goal of the metal is to hold the bone properly, so it heals. But if it doesn't heal, then the metal will eventually be compromised. So, it's a race. It's a race between the metal failing and the bone healing. And when bone heals, the metal did its job. But there are scenarios where the bone's not healing and patients will often say, "I have pain right over where my fracture was and it hurts directly there." And when you get an X-ray, you don't see bone bridging across the fracture. And so, we just have to have a low threshold for these patients to be able to recognize they have a nonunion or delayed union, and jump in and do something.

I think one of the things that I talk about with my residents when I teach them is you never want to say your baby is ugly. And you look at your fracture and you look at your surgeries and you look at them and say, "Critically, is this behaving the way it should be?" And if it's not, sometimes you have to act on it and say, "You know what, sir, ma'am, your fracture is not healing the way we want it to. We're going to have to do something else, right? We need to help get the ball down the mountain. We need to get the ball across the finish line. And your body only could do so much. We may have to go back and bone graft you or put a bigger rod in or add a plate, but we need to do something to get you to union." And a lot of times what I see happening is patients will go months and months and months, and be sort of more of the same. They're not moving forward with their healing, but there's nothing being done to help them get to that point either.

Melanie Cole, MS: This is such a great topic. And our last one that we're going to talk about as far as orthopaedic trauma and missed injuries is infection. I imagine this is pretty common, but tough to diagnose. Tell us what you're looking for and why this happens.

Dr. Samir Mehta: So, bone infections are interesting. Most bone infections stay very local and very focal to the area that's infected. Unlike other infections, say like pneumonia or urinary tract infection or something like that, which makes you systemically sick. Bone infections actually really only cause pain around where the infection is. And the body usually does a good job of sort of walling that area off to keep the infection from spreading all over.

Oftentimes patients have had some kind of trauma or injury to that area or maybe surgery, right? So, they've had an open fracture or maybe they had some kind of a rod or plate put in for a closed fracture. And the area is either not healing, going back to our nonunion conversation or it's healed, but there's a lot of swelling, there's a lot of redness. I sometimes use the word, it looks angry. Sometimes there may be drainage or pus coming out of a surgical incision or a traumatic wound site. But more often than not, there's nothing obvious that we can pick on or say that for sure it's infected. There's no blood test that for sure tells us it's infected. There's no imaging study that for sure tells us that it's infected. There's a lot of small clues that we can use. Things like an ESR and a CRP, which are blood tests that are not really great for infection, but they're a piece of the puzzle. We can get an MRI or a CT with contrast. Again, not always perfect, but another clue.

The history is really important. Open fracture, prior surgery. If there's something obvious like wound drainage, that's usually a sign. And there are many times where I'll see patients who are being treated with antibiotics, but no one's actually treating the source of the infection. And one of the things about bone infection is, especially if there's hardware there, that usually the infection won't clear until you take the hardware out. Not only is the bone infected, but the metal that's in the body as well is usually coated with infection. And so, everything has to come out for the body to be able to clear the infection.

Melanie Cole, MS: Wow. This has been so much information. As we wrap up and I would love for you to join us again, Dr. Mehta, anytime, because we could get into some of these a little bit more in detail, but tell us a little bit more about Penn's Orthopaedic Trauma and Fracture Services, what makes the program unique and when you feel physicians should refer their patients to you and your team.

Dr. Samir Mehta: Yeah. So, we've been doing this for a long time at Penn. Our only focus is trauma and fracture care and the complications thereof. Myself and the members of my division, we don't dabble in anything else. I grew up in an era when I was medical student and resident where every orthopaedic surgeon did trauma and fracture care. It was part of your normal sort of thing. Everyone took call. And even if you were a hip or knee surgeon or a sports medicine surgeon, you fixed fractures and did stuff on call. And I always said trauma was a recreational sport. Everybody did it.

Now, several decades later, trauma is its own subspecialty. It has the same nuances and science and precision that the other subspecialties in orthopaedics do. And there are surgeons who are trained in orthopaedic trauma. Fellowship

trained, it's all we think about; we eat, sleep, and breathe fractures and injury and infection and nonunions and malunions. And so, I think that's what makes us unique. Myself and my partners, that's all we do. We don't dabble in other aspects of orthopaedic injuries or orthopaedic surgeries. We don't do spine surgery. We don't necessarily do arthroscopy. We just fix fractures and the complications thereof. And so, I think that's what makes us really special and really unique. We've been doing it for a while and I think we do a good job with it.

Melanie Cole, MS: Thank you so much, Dr. Mehta, for joining us today. And to refer your patient to Dr. Mehta 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. That concludes this episode from the specialists at Penn Medicine. I'm Melanie Cole.