

Diagnosis and Treatment of Idiopathic Congenital Clubfoot

Idiopathic congenital clubfoot occurs in 1 in 1,000 infants in the U.S. and is considered the most prevalent musculoskeletal birth defect in the world. In this podcast, Richard Schwend, MD, FAOA, FAAP, Interim Chair, Department of Orthopedic Surgery and Musculoskeletal Science at Children's Mercy Kansas City, discusses a clinical report published by the American Academy of Pediatrics which covers background on the condition, evaluation and treatment – including the Ponseti technique, which is considered the gold standard of care.

[Click here to view the clinical report.](#)

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Featured Speaker:

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Transcription:

Andrew Wilner, MD (Host): Thanks for joining me for another episode of Pediatrics in Practice with Children's Mercy, Kansas City. I'm your host, Dr. Andrew Wilner, Associate Professor of Neurology at the University of Tennessee and Division Director of Neurology at Regional One Health in Memphis, Tennessee.

My guest today is Dr. Richard Schwend, Professor of Orthopedic Surgery, University of Missouri, Kansas City School of Medicine and past chair, American Academy of Pediatrics Section on Orthopedics. Dr. Schwend is a co-author of a recent clinical report from the American Academy of Pediatrics entitled Diagnosis and Treatment of Idiopathic Congenital Club Foot, which is our topic of discussion for today.

Welcome Dr. Schwend.

Richard Schwend, MD, FAOA, FAAP (Guest): Good morning, Dr. Wilner. Thank you for having me.

Host: Oh, definitely my pleasure. And I'm very eager to learn all about club foot, and of course, how it can be treated the most effectively for children. So how common a problem is it?

Dr. Schwend: Yes, it is, fairly common. It's one of the most common congenital deformities that we see in children. The prevalence is one to up to about two per thousand. And so if you look worldwide, there's about 200,000 children a year that are born with club foot and that's about 2100 in the United States. So, worldwide it's about 80% of children are born in countries with limited resources.

Host: Right. Well, in fact, for the last decade or so, I've been doing medical mission work in the Philippines, and I've seen adults with untreated club foot and it really can be quite debilitating. Many of

them walk with their feet are kind of angled in and some can't walk at all. I mean, it's really a very severe problem and I guess almost impossible to treat in adulthood.

Dr. Schwend: Yeah. And some countries, like the Maori children in the South Pacific, it's up to about seven per thousand, even in Hawaiian children, it's a higher prevalence and in these limited resource countries, it can really affect a child's whole life.

They have trouble getting into education because they have to walk to school, which they have trouble with. They can't wear shoes. So they are kind of excluded from school. They can't participate in sports. If it's a young person, it might affect their ability to get a job and even get married.

And so it goes through their whole lifetime until they get to be an adult. And then now they're having an untreatable club foot deformity.

Host: Right. And they have limited education and limited socialization. Well, you know, I'm a neurologist and I'm really interested. I mean, why does such a thing happen? It, there seems to be a genetic component, as you mentioned, that it occurs more often in certain races. So do we have any clue what causes this?

Dr. Schwend: There's a lot of strong genetic factors. The most typical clubfoot is isolated. So it can be seen in syndromes, such as arthrogyriposis. And obviously it could be part of a neurological condition like spinal bifida, but the typical idiopathic clubfoot there's about a 35% concordance in when you have identical twins, if a father has a clubfoot, the chance for the child having a club foot is up to about 35% in the second child. If a child has it, the sibling that's born next could have about 35% chance of having a clubfoot deformity as well. So it's probably genetic and the theory is multiple genes interacting with the environment.

Host: So I guess it's readily identifiable at birth. So what should the pediatrician do? There's a newborn, there's a club foot. What's step two?

Dr. Schwend: So a lot of times the pediatrician gets involved because it's seen on an early ultrasound, you can see it up to about 13 weeks, if you do trans-vaginal ultrasound and then about 16 weeks transabdominal. But what frequently happens is there's a just a routine screen that happens at 20 weeks and they see an isolated club foot deformity.

And so a pediatrician may get involved at that point and the parents would want to know all about what to expect in my child. And I think that the first question is, is it isolated and if it's isolated, that's reassuring. And then in my experience, almost all children nowadays it's already anticipated before they're even born, but when the child is born, I think what the pediatrician needs to do is do a very good examination.

And the most important part of the exam is the spine, because you want to make sure that there's not a spinal defect as the cause of it. And then a typical club foot deformity, you need to just differentiate the club foot that tends to be stiff and can't be corrected to a straight position versus a positional deformity that just happens because of third trimester crowding. And that positional deformity is very flexible and the foot can be corrected to a straight position. The true clubfoot deformity, it's not an emergency,

nothing has to be done in the nursery, other than just talking to the family. But within a few weeks, that baby needs to get seen by an orthopedist who has experience in the Ponseti method of treatment and we'll get into that.

Host: Okay, so it can actually be diagnosed prenatally. And then the objective is, is it isolated? It's just a club foot or part of another syndrome. And if it is just a club foot, then it goes to the orthopedic surgeon. Come up with a plan. Now, I guess in the old days, the instinct was, well, gee, there's something that's deformed. Let's fix it. And, so surgery, I guess, was often used. And then you mentioned the Ponseti method. Is there a choice between the two or is one clearly superior than the other?

Dr. Schwend: So, I think in the latter part of the 20th century, surgery was typically done for these feet. And you know, when I was training, years ago, that's what we did between about four and eight months of age. There was a thing called a comprehensive club foot release, and it was very extensive surgery to release all the tight structures of the foot. And that was standard of care. And Ignacio Ponseti was at the University of Iowa, and in 1948 is really when he started developing his method. And so of course, when he was developing this method of non surgical treatment, nobody really was hearing about it. And he just kept working on his technique and his technique was one of mostly just casting and very limited surgery.

And about 20 years ago is when it really started getting the attention of the Pediatric Orthopedic Society and people that were doing club foot surgery, and there was just this huge change in practice about 20 years ago, everybody went from being comprehensive surgical release, surgeons to adopting the Ponseti method because it actually works and it works much better than traditional surgery.

Host: I did read the clinical report, which you're a co-author in, and I was really impressed with the detail published by the American Academy of Pediatrics earlier in 2022. But it did sound like this Ponseti method, which is serial casting, bracing and an Achilles tenotomy, that it was a lot of work for the family, with the bracing and you know, little kids, they don't want to be constrained. How practical is it?

Dr. Schwend: If you can get to a center that actually does it, it does require weekly trips to the orthopedic surgeon that's doing this. So the method is, you know, an initial evaluation and oftentimes, the first cast is applied and then that's a weekly visit, for about five to eight casts. And I would say typically you can get the foot corrected with five serial casts that are applied and the, these are long leg casts. So they go above the knee. So they don't fall off. And I think people, when you explain to them that this technique provides a much better functional result, I think most family's are understanding of not having to put their little child through a big surgery, if they could get by with something that makes a little bit more sense physiologically.

So the casting is done. And then at about the fifth, six, seven, sometimes eighth cast is when a percutaneous tenotomy is done and it's usually done in at least Ponseti recommended doing that in the clinic because by doing it in the clinic, numbing up that area, you don't have to put a small child through anesthesia, which I think is safer.

And 90% of infants typically need the tenotomy of the Achilles tendon to get the full correction. Once you do the tenotomy, then you leave the child in a cast for a couple of weeks to just hold that position.

And then the cast comes off and then you institute the very long-term brace treatment.

Host: Yeah, that's what, I'm gonna read from your article here. It says after the first three months, the brace is worn at nighttime and nap time only with a goal of 12 to 14 hours of brace wear, I guess that's per day until the child is four to five years old. So it's a really big commitment.

Dr. Schwend: It's a huge commitment. You're basically keeping this toddler in a brace, every night and then also, additional time when they're napping or just sitting there just so they can get 12 hours of brace wear and the success rate goes up with the length of time that you wear the brace in terms of years.

So even the fourth year, you're getting increased success, by wearing the brace, if you discontinue the brace even in the fourth year, the relapse rate can be like up to about 30%. So, that's such a key part of it in and it's probably the most difficult thing for parents to comply with because, you know, you can just face it after a while you just get tired of putting this thing on, but it has to become part of the daily lifestyle of the child.

Host: Sure. Well, I guess if you're lucky, the child doesn't know any better. And just figures this is normal, I got to wear the brace.

Dr. Schwend: Yeah. This is a normal life. I've always done this. So ever since I was a baby, so what's different.

Host: But, can see how it'd be rough. So, do you have a specialized center? I guess there's a nurse who reinforces and explains and helps. And there's some psychosocial support, which I guess the necessity of which will depend on the family, but, is that widely available or do they have to go to a specialized center like yours?

Dr. Schwend: Nowadays, people that train in pediatric orthopedics don't get much experience with the comprehensive complete surgical release. Everybody nowadays gets trained in the Ponseti method. So, if you're going to see a pediatric orthopedic surgeon for your club foot, the chances are they've had training in the Ponseti method.

Now, If you're in a big center, there's certain of the surgeons that are there that take a special interest in club feet. So that they'll probably be the ones that are taking care of the child. But, even in smaller cities, I think you'll find a orthopedic surgeon that has experience in the Ponseti method.

And, I just wanted to say for the pediatrician, what's most important is to acknowledge. That's why we wrote the clinical report is the first four years of the child's life, parents are going to come in and complain that this thing is going on forever. And I think for the pediatrician, we wanted to make sure that they had an understanding how important the whole three phases of the treatment are the, you know, the initial casting. The tenotomy part, but then also the bracing part, and we were hoping that the pediatricians would then be able to help reinforce with the families how important the bracing is.

Host: If it goes well, and everyone does what they're supposed to do, what's the likelihood, the whole thing, this four year investment will actually solve the problem?

Dr. Schwend: So, the success rate with really good bracing, there's 90 to 100% success. Meaning that it's gonna stay as a corrected foot and not recur. That means about 10% of the time, the foot can start to go back towards a club foot position. And if it does that treatment then is to re-institute casting and try to get the foot back in a better position.

And then go back to the bracing again. Sometimes, in order to balance the foot better, the anterior tibialis tendon attachment is transferred to the lateral side a little bit with a pretty simple surgical procedure. And that procedure is done in the operating room and that can sometimes help to balance the foot when you've had a recurrence.

And it's often the child that maybe not been wearing the brace effectively. And, now they're having more trouble because the foot's deforming and the brace is getting more uncomfortable. And so those children sometimes will benefit by repeat casting and maybe that surgical transfer.

Host: Now we talked earlier, how many of these children are in limited resource countries and in fact, some of those countries actually happen to have a higher incidence, due to genetic factors. So they probably don't have easy access to well-trained orthopedic surgeons in many of these rural areas.

The surgical part of this seems to be fairly, I don't want to use the word trivial, but minor compared to the big picture of the casting and bracing. Can that be done by a non-physician?

Dr. Schwend: That's a very good question about who actually can do this technique and your work in the Philippines, you understand that, it's difficult for people to get access. They have to travel distances to get to care, and they don't even know where the care is and sometimes they don't even know what's possible.

And so a lot of the countries, that have a club foot problem. And I'll give you an example. I have a friend in Nepal that runs a center and they have outreach to the whole country and they do a lot of education to the physicians all through the country so that people are aware that they have a program.

And then of course it's very difficult, to get to the center. So what happens is they have to do transportation and then oftentimes the child comes for two months and just lives on the hospital grounds while they're getting their weekly treatment. So it takes a lot of commitment for a limited resource country to develop a program for this. Families just can't do it on their own.

They really need the support of a program. But your question about who does the casting, you can train technicians to do the casting, and a lot of the programs worldwide use orthopedic technicians that they've trained locally. Typically though, when you do the tenotomy and I think most children need the tenotomy, it's usually a surgeon, or a trained physician. It's usually can be done in clinic, but it's something that, I think it's still mostly done by surgeons.

Host: Right. Well, there's a reason why surgical training lasts seven years, I think.

Dr. Schwend: There's a lot of limiting factors though. Some hospitals require the tenotomy, you know, where the Achilles tendon is cut, they require that done in the operating room, just for, what they

perceive as a safety reason. But what happens then is families can't afford to have the child go the operating room because they have to pay for it. And so sometimes it doesn't get done and then that affects the results. And so I think that was why Ponseti recommended it to be done in clinic, because I think it's more cost-effective and he thought it was safer to do it. And, you know, rather than putting a small infant through anesthesia.

Host: Sure. And this sounds to me like because of the procedure is so long and a lot of remote locations that, you know, it might be a great role for telemedicine, you know, where the orthopedic surgeon could say check-in every six months and see how it's all going and say, well, you need to do this or you need to go do that. Or you could have a hookup with Nepal?

Dr. Schwend: That's a good point because, you know, nowadays more and more people are having either smartphones or access to somebody that has a smartphone. And so, a lot of these limited resource countries are utilizing some of that technology to send out reminders to the families.

You know, how's it going? Are you still using the brace? You know, the braces in some of the poor countries can be made locally. But that the communication is so, so important is to keep in touch with the families, make sure that they haven't given up or that there's not somebody in the family that's saying, hey, stop using this thing. It's not good for your child. There's a lot of education that is important. And that's where, you know, obviously where the pediatrician can really make a difference. Cause they have the relationship with the family over the long-term.

Host: Dr. Schwend, this has been a great discussion. Before we close, is there anything new on the horizon? I mean, it sounds like this Ponseti method works great. But big investment of a time and energy. Anything new or is this state of the art and we better use this for the time being?

Dr. Schwend: Yeah, that's a great question. Is like there some magic fix to this. I guess at the most you can fix the genetic component of it maybe decrease the prevalence there. I think that for now that Ponseti method is here to stay. I think the big challenge, both in the US and internationally, is the communication, people part of it is, first of all, getting people access to where the care is being delivered and also training of people to do the care. But the huge thing is to then communicate the importance of complying with the treatment and then getting people to stay motivated. And that just takes, I think, good relationships.

Sure. Well, Dr. Schwend, this has been a terrific discussion on the state-of-the-art diagnosis and treatment of club foot. I want to thank you for sharing your experience and the expertise.

Yeah, Dr. Wilner, it's been a pleasure. Thank you so much for her.

Host: This has been Pediatrics in Practice with Children's Mercy, Kansas City. Please remember to subscribe, rate and review this podcast and all the other Children's Mercy Podcasts. To learn more about developmental and behavioral health services at Children's Mercy, please visit children'smercy.org. I'm your host, Dr. Andrew Wilner. Thanks for all this.

