

Speaker 1:

Welcome to Optimal Neuro/Spine Podcast, a podcast about optimizing our brain and spine in health and disease. Each episode, leading neuroscientists, neurosurgeons, educators, patients, spine care and quality improvement experts discuss their research experience, emerging science, surgical advances, and insights about how to optimize neurological and spine care. Now here's your host, Dr. Max, Boakye.

Dr. Max Boakye:

Welcome to the Optimal Neuro/Spine podcast. Today, I have a really academic superstar Dr. Robert Starke. Dr. Starke is currently an Associate Professor of Neurological Surgery and Radiology at University of Miami Miller School of Medicine, where he's also Director of Neurovascular Research. He graduated magna cum laude from Princeton University with a distinction in Neuroscience. Subsequently, he completed medical school at Albert Einstein in New York, where he graduated with distinction in Clinical and Translational Research. He holds a Master of Medical Science with distinction in neuroscience research as part of the National Institute of Health Clinical Research training program.

Dr. Max Boakye:

Dr. Starke completed neurosurgery residency at University of Virginia, endovascular neuroradiology fellowships at Thomas Jefferson University and University of Virginia, and a cerebral vascular and skull based fellowship at Auckland University Hospital in New Zealand. He also completed a cerebral vascular research fellowship at Columbia university he's board certified in neurosurgery and certified by the committee on advanced subspecialty training in endovascular therapies in [inaudible 00:01:57].

Dr. Max Boakye:

Dr. Starke has a busy clinical practice performing more than 700 operations each year, specializing in the treatment of cerebral vascular disease, including aneurysms, arterial venous malformation, and fistulas, cavernous malformations, Moyamoya disease, carotid and intracranial stenosis, including bypass surgeries, brain tumor, and skull base surgeries. He has an extremely productive laboratory, which is supported by multiple grants, including more than \$3 million from the National Institute of health to study aneurysms his research, which we're going to talk to him about focuses mainly on cerebral vascular pathophysiology, including aneurysms, AVMs, intra cerebral hemorrhage, ischemic stroke models. He has co-authored over 700 academic publications in his young career.

Dr. Max Boakye:

It's my real pleasure to talk to him about his evolution to becoming a clinician scientist and what are some of the insights and lessons he's learned along the way that he can share with us, Dr. Starke, it's my pleasure to really welcome you to the show.

Dr. Robert Starke:

Hey, thanks so much for that. Thanks so much for having me on your podcasts, it has been amazing in helping other neurosurgeons and researchers, and you've got a tremendously impressive career. So it's really an honor to be here, but also thanks to you and the community for helping with these podcasts that are beneficial for so many of us.

Dr. Max Boakye:

Thank you for the kind words. Let's start by talking about your current practice. What is your clinical practice like? How much clinical work are you doing and how much research, how is the percentage of time spent in each area?

Dr. Robert Starke:

It's a great question. It's always a tough one to break down, because it is a little bit fluid. I do have a busy clinical practice. And I think in most of what I do is open vascular, some tumor and then endovascular. And usually each week I try and block out one full day to spend in the lab. And then probably most of the other time that I dedicate to research is after hours or in the afternoon when I'm done with cases or clinic. A lot of that is at nighttime. Maybe when everyone else goes to bed. After I put my son to bed, I try and catch up on all the other elements, but that's certainly the toughest thing is trying to balance clinical practice, research, family time, time with your friends, all those things.

Dr. Max Boakye:

You have been extremely successful by all measures, clinician scientists, even though you're very early in your career, describe your evolution. Let's maybe start with where did your motivation come from to pursue academic neurosurgery at such a productive level?

Dr. Robert Starke:

That's a great question. I think everybody that's starting out or at any level in their career, it's important to continue to reevaluate those things. I was a rock climber before I became a doctor. And for a long time I thought I was just going to be a climber. And then at some point I realized I didn't want to be the patient all the time. And I was tired of having accidents. So I eventually went to medical school. My dad was an internist and I always thought in the back of my mind, I was going to do internal medicine or emergency medicine. It wasn't until my third year of medical school that I realized maybe that's not really what I wanted to do. I did all the different specialty areas that I could trying to think. Well, now that I realized, I don't think I want to do internal medicine, what is it that I really want to do?

Dr. Robert Starke:

And eventually I realized I really like spending time in the operating room. And then I went through the progression of different specialties thinking I wanted to do gynecology or ENT. And eventually I really realized the brain and neurosurgery is far away the most interesting. And there's just so many areas that we don't understand and that we can make progress in. When I was in college, I really didn't have any interest in research or statistics or molecular biology or those things. Although I did some elements of those. It really wasn't until late in my third year that I really started becoming interested in the idea of research because I felt there were so many questions that we had unanswered and sort of late in my third year, I realized I really did want to do neurosurgery. And I was also really interested in research and understanding clinical trials and later even basic science.

Dr. Robert Starke:

So I decided to take time off between my third and my fourth year, I did the NIH clinical research training program. Thinking at that time, my main interest was clinical research, that there were a lot of questions that we could answer to help our future patients. And while I was doing classes in statistics and epidemiology and all the things that I didn't have an interest in college, I was also working at Columbia University doing basic science research, as well as translational clinical research. And that's when I really realized again, molecular biology then had real relevance for me.

Dr. Robert Starke:

So I became a lot more interested in research, starting at a cellular level, moving all the way through to a translational level all the way through to clinical trials. And so I tried to do my best to gain as much experience as I could. And I ended up taking two years off to just dedicate time for research and then continue to work on that as I finished medical school. And then pretty much throughout my residency, I tried to make it an element of trying to learn how to operate and be a good surgeon, but also learn and progress my skills in research.

Dr. Max Boakye:

So if I was to summarize in maybe one word, well, in two words, maybe like you were open minded and curious to the point where you took two years off to learn where you could and explore. And then you explored both the clinical as well as the basic science. In pursuing this what has been some of the most challenging aspects of trying to do both? So maybe you can also expand on where did you go from there. So you continued research during residency and then how did you transition that into faculty to continue to do that?

Dr. Robert Starke:

Those were great questions. And certainly I was very lucky that I was surrounded by great people that helped me out. The most challenging aspect is certainly trying to become a good surgeon while at the same time conduct research and learn, stay clinically curious, I guess, as you put it. So I did a number of fellowships. I also did dedicated time in the lab.

Dr. Robert Starke:

That was a very difficult thing to balance, especially in two of the years of fellowship because you're clinically really busy. So a lot of times it meant doing experiments at the end of the day in the afternoon or in the evening. A lot of times it meant while trying to get my son to bed at nighttime, thinking about these things and writing and reading. And maybe I was lucky at that time that I didn't need lots of sleep because it certainly was challenging to balance all of those things. I was really trying to make sure that I had all the skills to be a good surgeon, but also be a good clinician scientist down the road whenever I finally got to a real job, I guess you could put it.

Dr. Max Boakye:

What is your current setup for research and also a second question, how did you end up choosing the research area to work on?

Dr. Robert Starke:

Yeah, that's also a great question. Again, when I went residency, I had been mostly doing vascular research and so I was very interested in vascular neurosurgery. As soon as I got to residency, I realized I really liked everything. I mean, as a junior resident, probably you spend where I train more time doing spine and I actually really liked doing spine surgery. And I went through each of the areas again, trying to keep open-minded and say, okay, well maybe this is what I want to do.

Dr. Robert Starke:

And I think at the end I realized that I still thought that vascular was the most exciting and interesting. And there were so many areas that we still hadn't figured out. And although I really liked doing spine it

was more that I just liked to operate. The vascular, I really was interested primarily in open vascular. It seemed like the most exciting area to fix something that's right in front of you that's often emergent, but it wasn't until later that I really started learning about endovascular, which I didn't really have a lot of interest in at first, but later on, I became equally interested in endovascular realizing that it's just a completely different type of treatment options and has its own nuances.

Dr. Robert Starke:

And really there's tremendous ability for us to expand in those areas as well. As far as my research set up, again, I think I'm just lucky to continually try and surround myself with great people. I have a clinical research team that helps with patient enrollment clinical trials. Some of those are trials that we've started and some of them are trials that other people have started that we contribute to. And some of those are large randomized clinical trials, some of which are sponsored by the NIH and some which are sponsored by various companies. And then I also have a basic science or translational team that includes a primary scientist. Dr. Thompson has worked with me since I've been here, since I started at University of Miami. He's great. And then on top of that, having post-doctorate and doctorate candidates, as well as residents, medical students it's really about surrounding yourself with great people. And they really carry out a lot of the basic science and translational research.

Dr. Max Boakye:

So Dr. Thompson is a full-time like a PhD scientist?

Dr. Robert Starke:

That's right.

Dr. Max Boakye:

I see.

Dr. Robert Starke:

If you want to do basic science, there need to be people there every day. You've got to be checking on your cells, your colonies. If you do animal research, you got to have somebody there every day that's checking on those things and helping out. And even if I were to check on those things every day, myself alone, an army of one is not enough. During my fellowship and residency. I was lucky that the department supported me in having some lab space in Dr. Owens' laboratory. Dr. Owens was a smooth muscle cell biologist, tremendous researcher, huge lab, usually more than 30 people in his lab. And they were nice enough to give me some funds to have a little space in his lab so that I could use some of his equipment and I would attend his lab meetings. And he was really a senior mentor for me, along with people like Dr. Dumont and a lot of the other mentors that I had along the way that were both in neurosurgery and also outside of neurosurgery.

Dr. Max Boakye:

So when did you get to the point of hiring doctor, I mean, I assume you pay Dr. Thompson or is the department paying him for you?

Dr. Robert Starke:

That's right. So it was really when I took the job at University of Miami that I started hiring other folks for clinical and basic science research. I was lucky that the University of Miami and neurosurgery supported me with some startup funds when I started the job here. And then I basically tried to apply for every grant that I could to get additional funds to try and help pay for equipment and experiments and research and also salaries. Because there is a lot of costs that's associated with starting all these things.

Dr. Max Boakye:

For your basic and translational, are you using rodent models or what are you doing exactly?

Dr. Robert Starke:

Yeah, so I make cells. So we use cell culture and that includes cultural, arteriovascular endothelial cells, smooth muscle cells and stem cells. Then we usually, once we have substantial results, we consider moving forward in small animal models. So I make aneurysms in mice and rats and each of those have some pluses and minuses. And then once we have further substantial research, we can consider going ahead in large animal models, which include swine, canine and rabbit models. But really all of the research I try and work backwards from humans. So that means we collect blood and tissue from the operating room and the endovascular suite and develop results from analysis of actual cerebral aneurysms, the tissue or blood. And then we try and work back to the cellular environment and then forward in the last phases into animal experiments.

Dr. Max Boakye:

So kind of the bedside and back kind of bidirectional?

Dr. Robert Starke:

That's right, myself and many other people have made mistakes in starting in cells or even starting in animals. And the real problem there is you may develop wonderful results, but then they're not clinically or translationally relevant to humans because obviously those things are different environments and different landscapes. So I try and start with humans and work backwards.

Dr. Max Boakye:

Talk to me a little bit about the optimal setup. So would you consider what you have now to be one of the most optimal setups? So if somebody was to try to template off you, they would aim to maybe have a PhD scientist and set things up such that the clinical observation guides the questions that are being asked at a basic level?

Dr. Robert Starke:

Yeah, I think that would be wonderful. And it makes the most sense if you're clinically doing something every day and your research is in a completely separate area, you're always going to feel like you're getting pulled in two different directions. A lot of times I think the laboratory environment seems to be a smooth transition from the clinical environment because maybe we're taking tissue that we obtained that day and then going over to the laboratory to analyze it. So I think it definitely helps if your research interests are embedded in your clinical research and then the same thing with moving forward from a translational phase to a clinical study and then eventually to potentially a randomized or a prospective trial. If those are your everyday patients, you really start thinking about how can I be beneficial for the

next series of patients. In the back of my mind, the motivation is always, we've got to be doing things better in the next 5, 10, 20, 30 years than I am now. If I'm doing the same thing in 30 years, I feel like I've done a huge disservice to my future patients.

Dr. Max Boakye:

So how do you innovate? How do you come up with ideas? You've been very successful. Maybe you can also touch on how your research is currently funded, but how did you, for example, maybe tell the story of how you got your first major grant, which is the R01, which has alluded many neurosurgeons at the assistant professor level.

Dr. Robert Starke:

Yeah. So for the grants, that's one of the toughest things. I think most neurosurgeons were not very good at dealing with failure and we're maybe not used to it. Most of us have done well on standardized tests and most of us have gotten pretty good grades and we're used to of succeeding at each level. The grants is very demoralizing and I think most of the time people don't get funded because they're just not used to that level of failure. At least if you write a paper, a manuscript on research, it might get rejected from a number of journals and that's demoralizing, but usually you can usually submit it to somewhere else that's willing to publish it. And at the end of the day, you have something to show for your work. You've got a publication that you can add to your CV or something like that.

Dr. Robert Starke:

The grants is very demoralizing. When you spend year or years, some of these grants were years in the making and they're not funded. That evening I always think, man, I've spent so much time banging my head against the wall and working on this and rewriting this. And you really kind of have nothing to show for it in terms of there's no funds, it's not something that you can put on your CV. It doesn't push your research along and you spend so many hours working on the grant. So I think my main advice is you've got to have thick skin and you've got to be willing to continually bang your head against the wall. A lot of advice I got was that if 50% to 80% of your grants are not being rejected, then you're not writing enough grants or you're not submitting enough.

Dr. Robert Starke:

I started out with applying for as many of the small grants that I could find in the vascular field just to try and get some research, to get things off the ground, to get preliminary research. And then once I had one or two small grants, then continue applying for small and medium grants to try and get more funds. And then while I was doing that, and once I had developed further preliminary research, I tried to start applying for NIH grants and that was incredibly demoralizing. I started out applying for the K12, which I did not receive on two occasions. Then I started applying for K08 grants, which I got completely rejected, all of those. And it's really difficult to keep getting those rejections. But the reality was all of those elements were incredibly important for my development and for my research because it helped me look at my ideas more carefully, develop further preliminary data, work harder and figure out what I was doing poorly and develop those areas better into an R01. My initial R01 submission was not funded and it got a terrible score.

Dr. Robert Starke:

And I remember going home just being very demoralized because I felt okay. I failed at the K08. I failed at the K12, my R01, got a poor score. And then I had to go back and work on all those things again.

We're not used to that. Most neurosurgeon are not used to that level of complete failure. So if you really want to do research, you've got to be invested in developing preliminary data, working on grants and getting those grants funded.

Dr. Robert Starke:

I think one of the questions in here was that we were talking about is grant writing. Just like the research your grant writing needs to be continually worked on and polished. Each time I got rejected, I passed my grant around to mentors, friends, anyone that could help me in any way to try and get input. And then all of those sessions at each of the national meetings, I went and attended the K12 or the K08 or the R01 classes to try and get further feedback. And then on top of that, I took the grant writing class at University of Miami, which was incredibly helpful meeting for three or four hours every week to go over and work on your grants, to get them to progress forward. Without those things, I certainly would not have been successful at any level.

Dr. Max Boakye:

That is so inspiring to hear. People see you and they see the finished product like you're successful and they don't know everything that you just told us. They think you just are a magician. You wrote to your R01 first pass got funded and you just gifted and you probably are, but it's good to know that your talents plus the hard work, a lot of sweat equity there, that's really. Talking about grants. So you took a lot of grant writing. Is there any books that you read or anything that comes to mind offhand?

Dr. Robert Starke:

I didn't read any specific books on grant writing, but I probably should have. I think it's mind blowing how naive I was when I first was writing grants. How before my grants were, I still have copies of some of those that I look back on every now and again and going all the way back to the first manuscript I ever wrote for a research publication. I thought the same thing. I had a mentor that looked it over and he basically crossed almost every word out. It was completely red and I was very demoralized, but that's part of the learning process. And I think that's 100% the truth that there has to be an evolution where you start out at a certain level and you've got to improve over time. You're not just going to walk into success.

Dr. Robert Starke:

The K08 grants, my understanding is 50% of them are funded if you continue to work on it for five years, which gave me tremendous inspiration because I thought after I got rejected twice, I just said, why am I even doing this? It's like a waste of my time. I gave one or two talks at the NIH. They seem to a talk that I give, which is something along the lines of evolution of failure and path to R01. And it's really about an hour long talk about how many failures I had before I had some sort of success. So it's easy to see somebody win an award without understanding really what went into all of that work.

Dr. Max Boakye:

You didn't touch on how you innovate. So you still have to be able to come up with good ideas. So do you have a formula for that? Or, I mean, does the ideas come to you naturally in the middle of the night? How do you innovate?

Dr. Robert Starke:

I mean, I think that is a great question. First of all, I'd say surround yourself with great people. That was what Dr. Jane always said. A lot of the credit for all this stuff is it's just part of being a great team. The second part, I think is just being clinically curious. Every day, we're doing things and you've got to be able to question, is this really the best way to do it? Why are we doing it this way? Who came up with this? How can we adjust one little thing that they could potentially have much better results? And so I think that's the main part is just being curious about what we're doing and questioning why we're doing it and discussing that with other like-minded sharp people on a regular basis.

Dr. Robert Starke:

Because certainly I can't take credit for a lot of these things. A lot of the things that we do in research are a slight increment or improvement that we get by standing on some giant's shoulders. So I have to give credit to so many of the people that I work with and so many of the people that came before me for a lot of these ideas.

Dr. Max Boakye:

So it sounds like the University of Miami is sort of the perfect environment for you. What kind of decision making led you there? How did you choose a faculty position that allows you to thrive?

Dr. Robert Starke:

Yeah, that's another great question. And a really tough one. Certainly some of it is luck, luck and timing. I think for me, the main things that I was looking for was a place that was clinically busy in my area. I wanted a place where they actually needed me clinically. There are some places that are willing to make a job for you, but then you might not have much to do clinically maybe as a researcher, the latter is better. It might be better to step into a place where you're not clinically busy, at least in the beginning. And over time you build up your practice, but that gives you a lot more time to work on research. And in hindsight, maybe that was advice that some people gave me that I don't think I listened to that carefully, but maybe starting out in a place that's not as busy gives you more time for your research.

Dr. Robert Starke:

So I think you have to decide what your focus is in those realms. The couple things I was lucky with is one reason I took the job at University of Miami is certainly the clinically busy aspect. Another part was having multiple partners that do what I do. So I think vascular is tough in that if you're going to take stroke call, it's fairly intensive, meaning coming in and on the weekend and after hours is a pretty regular thing. So you got to have other partners that do what you do to help support you so that you can also get research done and focus on other things. And so I felt very fortunate to have multiple partners at University of Miami that do the types of things that I do and to be able to see them successful in that environment.

Dr. Robert Starke:

And then the other element is the infrastructure for what you need, which is always the hardest thing to quantify. I really wanted to go to a place where either I could purchase or build an angiography suite for research or a place that already had that in place. So that was a real plus at the University of Miami is that where my lab is downstairs there's biplane angiography, right next to that is an MRI machine right next to that is a CT machine. We just put in an ultrasound. All of that is for dedicated research and those were pretty expensive pieces of equipment. So when I was originally thinking about that, it's a bit overwhelming to think, wow, am I going to purchase some sort of angiography machine and sort of

figure out how I'm going to do MRIs and CTS and things like that. It's pretty substantial. So I think that was a major reason for me taking the job here.

Dr. Max Boakye:

So is it possible to have it all? NIH grants, high clinical volume and a balanced life?

Dr. Robert Starke:

That's also a great question. And I think that's the thing that I would certainly say I contemplate on a regular basis. It's probably best to focus on one thing. That would probably be the advice I would give other people. It's hard to be a great surgeon and a good teacher and do good quality research and be a good family person and a good father or wife, and also be a good friend to your friends that are outside of neurosurgery. That's a real challenge.

Dr. Robert Starke:

And so usually the advice I give people is try and focus on one or maybe two things. It's very difficult to do all of those things and also be a leader in organized neurosurgery. So it's probably better to pick one or two things and focus on those. I think we all learn in training that we're not supposed to have balance that it's supposed to be sort of like drinking from a water hose. But I think that having some element of balance is extremely important because if you're just always focused on work and you're always banging your head against the wall at work, then you're going to be very one sided. Obviously those other parts of your life are going to be crumbling. But on top of that, I think your work really crumbles as well because you don't have those outside influences that are so important and helpful.

Dr. Max Boakye:

You've written over 700 papers in academics, publications are obviously the currency. What is your process for writing? When do you write, do you write a little bit every day? Are there any strategies that you'd like to share?

Dr. Robert Starke:

Yeah, that's a great question. I mean, again, it certainly helps to be surrounded by great people and have an amazing team. And I collaborate with so many people at University of Miami, but also at so many other institutions. So that's obviously incredibly helpful. I probably do some writing a little bit every day, but a lot of it happens when I feel like I can really focus. And a lot of times that's at nighttime after, to be honest, after my son goes to bed and I can kind of have real peace and quiet and focus. I do think it's important not to get too focused on the quantity of publications. The main focus obviously should be on quality. I certainly can say that my publications really range from case reports all the way through to rigorous studies, but I think it is important to maybe have some element of all of those, you want to focus your time. But I think most of us would trade one in New England journal of Medicine paper, or one nature paper for hundreds of case reports. So that's an important thing to think about as well.

Dr. Max Boakye:

So which research and publications would you say you're most proud of?

Dr. Robert Starke:

Again, that's a good question. Probably the one that I'm most proud of is, was a very long drawn out team effort, looking at the molecular mechanism by which cigarette smoke contributes to cerebral aneurysm formation, progression and rupture. And I think that that project was ongoing, that just for that single publication, that was at least five years or more of work and it involved many people, lots of different scientists, lots of people from expertise in different areas. But I think in that publication or in that many series of experiments, we found that environmental factors like hemodynamic stress, hypertension, and smoking contribute to vascular injury. And we assessed the molecular mechanisms by which that leads to aneurysm formation, progression and rupture and identify key molecular alterations within that process that we could then look for future inhibitors to toward that process with the idea that potentially we could develop a medication or a better minimally invasive treatment option or molecular imaging that would help identify at risk aneurysms and also develop better treatments for them.

Dr. Max Boakye:

How important has mentors been in your career development? Maybe you can talk briefly about your relationship. How are you a good mentee? And do you meet with them once a month? How have you been using mentors in your development?

Dr. Robert Starke:

Yeah, that's another really important one. And when I give a talk, I always put up a slide of all my mentors and it's tremendous how many people I really consider a mentor that helped me, many of which are inside neurosurgery, but many of which are in such different disciplines outside of neurosurgery. And I think that's really important for your research to get outside perspective and it should be some of those people need to be completely outside your area. I've always been happy to ask for help. So I've continually sought out more mentors, especially when there was something that I didn't have experience or I didn't understand. So even though Dr. Owens might have been my primary mentor at University of Virginia, I also had Dr. Dumont who's a vascular neurosurgeon. And then there were a lot of models in things that I was interested in that they didn't have expertise in.

Dr. Robert Starke:

So I went and visited. I actually spent a week at UCSF with Dr. Hashimoto at the time learning more about aneurysm models. Down the road I went to Iowa with Dr. Hassan and spent time with him learning more about his methods and how he looks at research. Even as a faculty member, I went to the Mayo Clinic in Rochester and spent multiple sessions with Dr. Kelmis looking at his models and how he does his research. And over time, I've really tried to visit other areas to see how people do things, especially if it was something that I didn't know about or I needed or wanted to gain expertise in. Those people really have become mentors and friends and that I can call them when I'm having problems, issues, troubleshooting. And that goes for research, but also goes for grants, and other life areas, obviously.

Dr. Robert Starke:

So you really got to surround yourself with multiple different people. And I think ideally you would meet with them as much as you can. That might be daily. If you're doing a dedicated year of research, maybe you're lucky enough to meet with them every day or every other day, but certainly at least once a week and then meeting with them one on one, but also having overall lab sessions is important and then Zoom and all these things have really created an environment where you can regularly catch up with

people at other institutions. So I still like to have meetings with all these different people as best I can to push my research board.

Dr. Robert Starke:

Obviously it needs to be a two-way street. As a mentee I try and help them in any facets that I can. And the last aspect of your question was I think being a good mentee means working hard and being curious and doing your best to complete your work, but also bring something to the table so that their investment in time is seeing you improve and get better, but also helping them in some facet, if it means helping their research as well.

Dr. Max Boakye:

Looking back in your young career, any obvious mistakes or regrets, is there anything that you would do differently that would've made your trajectory even more fun and more efficient?

Dr. Robert Starke:

Yeah, that's a great one. I think going way back, I wish I had learned more about molecular biology and statistics in high school and college. Although I did have those opportunities, I just wasn't interested in it at that time because it wasn't clinically relevant yet. I mean, now I'm very interested in those things, but mainly because they're relevant to me.

Dr. Robert Starke:

So potentially starting earlier and gaining techniques, methodologies, all those things would've been beneficial. The other thing is you obviously got to be careful in balancing your time. And when you like to operate, that does make surgery more difficult. So you really have to block out time to do your research. And I think most neurosurgeons are worried when they start their job, that they're not doing enough and they're not contributing enough. And I remember meeting with my chairman and saying, how many cases would you like me to do in my first year or first three years? And he said, I think a 100-150 sounds pretty reasonable, which would sound like a low number to me. And I was think like many young neurosurgeons worried about not doing enough cases, not having my operative skills progress fast or fast enough and developing clinical volume, but at the same time, once it's there, it's very hard to turn that faucet off and it's hard to go back and make more time for research once all of those things have really been put into place and you're clinically very busy.

Dr. Max Boakye:

Let's kind of switch gears a little bit and talk about the development of clinician scientists. First of all, why is it important to train clinician scientists? And what is the future of the clinician scientist training pathways?

Dr. Robert Starke:

Those are great questions. I mean, I think people that are working with patients every day really get an understanding of what's clinically relevant and how we can do better in terms of patient care. It's hard to balance that with basic science, meaning being a good basic science scientist with doing clinical aspects. But some merger of that I think is really where we're going to develop the major breakthroughs that change how we're doing things.

Dr. Robert Starke:

It's looking back at a procedure and saying, "Wow, we didn't really do a good job of this. We've got to be able to do this better." That leads to the innovation down the road to really change things. And like I said, it sounds trite, but I'm constantly thinking about, I've got to be doing things better in the next 5, 10, 15, 20, 30 years. It would be a huge disappointment if I was doing things the same way 30 years from now. As far as developing clinician scientists, I think that's a real challenge because it's very hard for people to have the environment to develop as good technically proficient surgeons, meaning devote enough time to learning surgery and being a good surgeon and also devoting enough time to develop as a scientist.

Dr. Robert Starke:

There are a number of programs through the ANS and CNS that help with that. And it may start with just a seminar at a national meeting, but they also have the young clinician program, which I was really lucky to benefit from, which met at each of the major national meetings. So we met many times a year to go over our grants. And it also paired me with senior clinician scientists like Dr. Zipfel and other people that were really helpful in guiding me in the right direction. And that meant research grants, all of those things. So again, senior people that devoted time to help me succeed and in turn mid-level and senior faculty needs to continually turn around and try and give that time back or pay it forward for the next series of people that are going to come through. Because the major breakthroughs are undoubtedly going to keep coming from people that are younger than I am.

Dr. Max Boakye:

So for young faculty, your advice would include taking advantage of the CNS and AANS developmental pathways. And then maybe also looking for some K awards. I think the academy also has a career development grant, the ABNS or the academy?

Dr. Robert Starke:

That's right. And the young clinician investigator program was really tremendous, is really through the ABNS. So it was the American Academy, the senior leaders in neurosurgery that got together and said, we should develop a program to help young clinician scientists. And I was very lucky to be able to get involved in that and meet with those senior people on a regular basis that helped push me along. So that's another thing for people to look into.

Dr. Max Boakye:

So can you summarize three pearls or secrets to an extraordinary career as a neurosurgeon scientist? What would be your top three?

Dr. Robert Starke:

Yeah, that's a great question. I would say number one, surround yourself with excellent people and that needs to be mentors, collaborators inside the field, outside the field, researchers, students, you got to surround yourself with excellent people. Your research probably has to be to some degree, a hobby as well as a profession so that you're thinking about it in your free time, as well as your work time. And there has to be some element that blends those two together. And it has to be something that you actually enjoy doing. You've got to read in your own field, but also in other fields to figure out what are other major breakthroughs? How do people get there? How did they fail and how do they succeed? And

I think the last thing maybe I'm adding four is you've got to learn and improve for your own failures. We usually see people in their successes, meaning their awards and things like that. But it's usually that means they've had a tremendous amount of failure before getting there. So you've got to learn from your own failures, but also other peoples in your development as you go along.

Dr. Max Boakye:

And that gets to my next question, is advice to current clinician, scientists that are struggling. So let's say you get an assistant professor job at a good place or reasonable place, but you're struggling. You've gotten your grants turned down, you're now five, six years out. You don't have a K award. You don't have an R01. What is your advice when you get yourself and you feel like life may be passing you by a little bit, you're a little bit behind, you have a couple of colleagues that already have the R01s or their Ks and you're sort of feeling a little bit behind the ball. What are some of the advice you have for career scientists who find themselves in that situation? I guess the other corollaries being mid career and you had initial grant funding, but then you lost it and you are struggling.

Dr. Robert Starke:

Yeah. I think the best advice that I got, because I was very worried about all those things. And when I kept getting my rejections was focus on doing good research and that really came from Steve Korn at the NIH. He really pounds that through, if your focus is not on the grants and it's not on the funding, the money and it's not on the publication, if your focus and I mean this honestly, is on doing good research. Those other things will come now. They may not come right away because as I said, probably the publication that I'm most proud of took more than five years of work, but if that's your main focus, you will get there eventually. There are programs for people that are even late in their career that realize I really want to go back and do research. I think the number of the really big scientists started late in their career and they took courses and programs through the NIH to go back and learn more about research and develop a research career late.

Dr. Robert Starke:

So I think anytime is possible, one of my other biggest mentors was Dr. Edward Oldfield. And for the folks that aren't familiar with him, he was the Director of Neurosurgery at the NIH and research for almost 30 years. And he's probably the most cited or up there in terms of the most cited neurosurgeons of all time. And interesting thing is that Dr. Oldfield started in private practice in Kentucky, in neurosurgery and had no real background and limited research experience. And he had been in private practice and realized he had a lot of clinical questions and he felt very unsatisfied with his work. And so eventually he went back and got an academic job and then eventually started working at the NIH, even though he took a substantial salary cut and over time became this tremendous leader in academic neurosurgical research. But of course we all see the finished product and think, oh, he just took a linear trajectory. The reality is most of us or many people, it's a very circuitous path and you can always change directions.

Dr. Max Boakye:

Wow. That is an extraordinary story. That's really incredible. Dr. Starke, my final question to you is a question I ask everyone. So a magic wand question. So if you had a magic wand, how would you improve the process of developing successful neurosurgeon scientists? And I know we've talked about some of the things, but if you had unlimited resources and a magic wand, what are some of the things that you would do?

Dr. Robert Starke:

Yeah, man, that's another great question. And definitely a tough one. I think one of it is time. All of these things require a lot of time. It takes a lot of time to develop the technical skills to be a good surgeon, but it also takes a lot of time to develop the skills to be a good researcher. So during your training, before your training, after your training, you've got to be able to make time for the research part to develop those skills and look outside the box that you're in. So expanding the time window for those that really want to pursue those trajectories. Maybe that means having more protected time to do research if that's something that's really going to be important for them going forward, which is not all residents. On top of that, we talked about the young clinician science training pathway that was incredibly helpful and beneficial to me.

Dr. Robert Starke:

And I have to give a lot of credit to all those senior members that came up with that idea. And then also invested time to make that a reality. More workshops to help young scientists develop, put them on the right pathway and help them when they develop roadblocks or failures. I think the main thing is it's just so easy to give up on all these things. There's so many easy outs and ways to say, "You know what? This is too difficult. It's too much time. I'm not going to do it." So having all these other things in place to support clinician scientists so they can be successful.

Dr. Max Boakye:

That is really awesome. Really want to thank you for really very valuable insights for sharing some things that you've learned along the way that I suspect is going to be really helpful for young and old clinician scientists really appreciate. It's really been an incredible hour speaking to you, Dr. Starke. Thank you very much.

Dr. Robert Starke:

Thanks so much for having me and thanks so much for investing your time in these podcasts and to helping others along the way. Certainly I hope that this will help at least a few people or a handful of people that were sort of struggling at the same points that I was. So thanks again so much and wishing you and your team all the best.

Dr. Max Boakye:

That's awesome. Thanks.

Speaker 1:

Thanks for listening to Optimal Neuro/Spine Podcast with Dr. Max Boakye. If you enjoyed this episode, we hope you share it with others. Leave us positive reviews on social media or leave a rating and review on iTunes. Check out our website, MaxwellBoakye.com/podcasts for show transcripts and other information. Join us next time for another edition of Optimal Neuro/Spine Show.