Episode 21 Roger Smith - Transcript

Michael Roberts [00:00:09] Welcome to the Health Connective Show. I'm your host Michael Roberts, here with my co-host today, our COO Justin Banutelle. Today we're talking to Dr. Roger Smith. He's a chief strategist at modelbenders.ai.

Dr. Smith is an expert in robotic surgery technologies and AI in health care. He currently owns his own consulting company, and he has previously worked with the Global Robotics Institute and the Nicholson Center within Advent Health. He's also an author of both fiction and nonfiction books centered around robotic and AI technology. Dr. Smith, thanks so much, and welcome to the show.

Dr. Roger Smith [00:00:41] I appreciate it. I am looking forward to that.

Michael Roberts [00:00:43] Absolutely. So we were both just at the Society of Robotic Surgery Annual Meeting. It was here in the United States this year, so that made it a lot easier to be able to attend. But you were actually a speaker there and you spoke about some of the fiction writing that you do, as well as sort of speculation about where this technology's going. So we'll definitely be digging into all of that, but where it's going. Let's start with today, how many of these robotic surgical devices are being used in hospitals right now, and where are they primarily being used?

Dr. Roger Smith [00:01:15] Right. So my estimate there's about a dozen that have been FDA approved. And if you get them moving between hospitals, you'll see them used in different places. I would say there's probably not any hospital that uses all dozen that are approved. Usually a surgeon and a hospital will zoom in and focus on something special. And so like we know the Intuitive da Vinci robot is the 800 pound gorilla that you find almost everywhere. If you have a major regional hospital in a large city, they probably have a da Vinci.

And then if you go into orthopedics, you might find the Stryker Mako robot being used for hips and knees, or the ROSA robots that could be used in brains and also in orthopedics. And then Medtronic has the Mazor robot that assists with spinal surgery. And there are several devices for cardiac catheterization that classify themselves as robotic because the machine does help push the catheter in. That's the ones that I see the most frequently.

Michael Roberts [00:02:27] Sure. Yeah. And you know, when we were at the meeting, one of the big talking points at the meeting was like, hey, there are 50 robots here. But that doesn't

mean that 50 robots are being used everywhere. It's just, hey, they're happening all around the world.

Dr. Roger Smith [00:02:40] That's right. Yeah. They are. Virtual Incision was there. A spin off of the University of Nebraska and their robots. A little tiny thing, 2 or 3ft long. And they were kind of a star because they just did a demonstration of telesurgery from the ground up to the space station. Yeah, yeah. All they did was remotely cut some rubber bands in a skills trainer, but they were showing that it could be done to space, and they were also measuring the latency that they were getting. So they were small, but they had some PR behind them.

Michael Roberts [00:03:18] That always helps, always helps. It was really interesting to see just how much the concept around tele surgery was being mentioned, and we'll definitely get into that in just a second. One of the other things that we definitely, of course, have heard over the last, I would say since ChatGPT launched, right, is everybody's going, "oh, and we have AI too, by the way." You know, like, hey, we were kind of working on this already and nobody really cared at the time. But now that ChatGPT is out and everybody kind of knows what AI is, now we're all going to talk about how big of a deal AI really is.

So, you know, how is it being used right now? Is it mostly just like we've had some guests that have been able to talk to us about like, hey, this is what AI could do in various areas like finding different types of novel medications, finding different ways of handling diagnostics, all of that fun kind of stuff. But, you know, where are we at today with how AI is playing with these different facilities?

Dr. Roger Smith [00:04:13] Well, at least two of the systems that I mentioned have been using AI in their platform for five years or more. A long time. And they're not using the large language models that everybody talks about today. I don't think they were even using the deep learning models that came right before that. Those two, one is Stryker Mako. So the Mako robot assists with hip and knee replacements, and part of that job is cutting off the ends of the femur and burrowing a hole into the bone so you can put the implant in there. And Mako takes the images that are taken before the surgery, loads that all into the computer. And together, the surgeon and the computer plan exactly how deep those holes need to be and exactly what needs to be burrowed away.

And then, during the surgery, the computer is just as in charge as the human is. So the humans holding the handle and moving the drill or the burr around, but the computer is controlling how deep the machine will allow the hole to be drilled or where bone is taken away. And Mako, since its beginning, has told people that we could do this without the human's hand being on the control. We have that level of control. But right now, nobody wants that. Surgeons don't want that, the patients don't want that. I think the insurance companies don't want it. So we don't

enable it. We just put it in the guardrail to make sure the surgeon does what they have planned and does it exactly as planned. So there's no "Whoops. Slipped a little bit, went a little too deep, cut away a little too much." But so that doesn't happen.

And Medtronic Mazor is doing spine surgery with the same big idea. They do images of the spine. And then they plan what implants need to go in, which screws and pedicles need to go in. And that's done with the AI and the AI of the software. They didn't really use the word AI back then, but it was intelligent software that would suggest which screws were best for the size of the bones that were involved. And then when it was being done, it would help guide to make sure that the screw went in exactly the angle that the surgeon had planned. The same big idea as the Stryker. So there's two. And it's easier with orthopedic surgery because you image the bones and you get an exact match, and then you position the patients and they match them with the images. And while you're doing the surgery, there's no soft tissue flopping around, removing everything, staying where you put it. And so the AI doesn't have to work as hard to manage the surgery.

Michael Roberts [00:07:09] That's funny.

Justin Banutelle [00:07:10] Yeah. That's consistent with a lot of what I've seen, what I like with the handful that I've worked with where they had something incorporated, the preoperative planning component simply where it's the most straightforward win.

Dr. Roger Smith [00:07:22] Yeah, exactly.

Michael Roberts [00:07:24] So question for you because, you know, you talked about how companies are talking about it. So a lot of people who we talked to as a company are marketers and/or business development people, you know, commercial folks that are trying to figure out positioning, how to talk about their device, how to get their information out there.

I was actually just having a conversation with a family member yesterday, and we were talking about whether or not there was any kind of artificial intelligence involved and sort of like some of the procedures that they might be doing. I found myself leaning away from that term AI, from artificial intelligence and talking more about computer assisted, types of, of, you know, things because I felt like it would freak them out less. If I just kind of talked about it going like, hey, the surgeon's in charge, but there's some computer assistance that happens and so they can be more accurate. How have you seen that play out, I guess when you're talking to companies or patients or doctors around all that? **Dr. Roger Smith** [00:08:17] Right. I think the doctors talking to patients are very careful. They don't, they don't want to say "AI" because I don't think the general public is--they're comfortable with it if you're talking about playing around on your computer and/or on your phone and generating a little story or a cute picture, but when you're talking about their health, I think it's not common yet. It's not something they're comfortable with.

When I started working in medical robotics in 2010, I found that I was fascinated with the technology. But when I mentioned it to my family or people that I work with in other fields, they were really freaked out about it. They were really uncomfortable, and I didn't realize that until I started talking about it in my daily life. And so I think AI is at that same vein, the people who have been working with it for five years are very comfortable with a certain level of it and implementing it, but they're finding when they try to discuss it with people who haven't even thought about it or haven't seen it move gradually into health care, that it scares them. And so I think they'll shy away from it.

Something that happened, you know, all the phone makers and the big social media companies are all talking about AI. Apple, at their recent Worldwide Developers Conference, released their version of AI, but they renamed it. They called it Apple Intelligence. And there was a lot of speculation that what they're trying to do is get away from terms that either scare the public. Or that are so broad that it's really hard to put boundaries around it and create public expectation for it.

Michael Roberts [00:10:01] I want to get more specifically back into some of, you know, surgery and all those kinds of things in just a second, but I guess, do you see AI models, you know, there's been a lot of talk about whether they're just kind of these very broad tools, like something like ChatGPT where it's just, you know, the LLMs doing their thing for all the situations. Or do we get narrower on the types of tools that we use going forward, so that we can better confine expectations and confine what these tools are supposed to do?

Dr. Roger Smith [00:10:28] Yeah, I think they'll get narrower. They need to get very narrow and specific. I've been using ChatGPT and Quad for some research into robotic surgery, and it dawned on me that these models are trained on, you know, pretty much everything on the internet. So that means when you talk to them about robotic surgery, they have learned from medical journals--sounds good--medical textbooks, anything published by doctors. But they've also learned from science fiction, from marketing promotions, from all kinds of other sources. And the models can't really tell the difference between what is medically accurate and what is speculative, or the social media discussions around robotic surgery.

So all of that goes into the same mix and makes them less reliable when you need to do, you know, medical determination. So I think there's got to be some models where they restrict it to

learning just from approved and authoritative sources, so that you know that it's not learning something that's from one of my science fiction books and assuming that that's real. So that's why I think it's got to get more focused.

Michael Roberts [00:11:43] There were some examples of Google showing off some of their, like, summarization results that they were doing, which has had various, you know, ups and downs in terms of success. But one of the sources they cited was like "one Redditor said this." It's like that does not inspire me with confidence at all because one Redditor said something.

Justin Banutelle [00:12:03] So we talked a bit about, like, AI in medical devices or within robotics specifically, but I guess I've seen some medical device components as well that are like slotting in alongside the robotics. One thing that came to mind when we're talking through this just now was, I think Medtronic, a Device Talks we were at last year, or maybe it was the start of this year, I can't remember. I lose track of time. They had something, I think they called it like GI Genius. The idea was that whatever device they were using, like the video feed that comes through, you root it through this and it's doing its own, like AI assessment of the imagery to help identify where potentially polyps may be and components like that. So they were really touting AI in that regard as something in the room that's assisting. Yeah. I was curious, like what you're seeing around things that are kind of ancillary to the robot itself that may be performing a procedure.

Dr. Roger Smith [00:12:59] I've seen a couple of endoscopic applications, like what you're saying, where they route the image and then they don't, they don't try to do the surgery. They just put a little box around the pile up and say, I see one here. And I think most of the time, let's pick a number, 90% of the time. The surgeon also sees it there, but maybe 10% of the time the surgeon doesn't see it. And because he doesn't want to be more accurate, yeah, he or she can go find it.

Yeah, I think that's similar going back more than ten years. I mean, the imagery, medical imagery has been used in using AI to find cancerous cells and things like that in samples for a long time. And you see several examples where the AI could see malformed cells that the human eye couldn't pick out so, so easily. And not only could it do it faster instead of, you know, strenuously, just watching the screen and seeing thousands of cells go by and hopefully catching them. But it would pick up things that were really hard for the human eye to pick out, so that now doing it with polyps and things like that makes perfect sense. And wouldn't you think that people would feel very safe with? Like, good, the AI is not going to do anything to me. It's just going to point the surgeon at things that they might not catch on their own.

Michael Roberts [00:14:21] The whole concept of like this kind of borrowing examples from other fields to say like, hey, you know, like the whole like lane assist technology that's happening in cars, this is what we're incorporating into it. And I think I heard, you know, similar pitches to either one of the startups to something along those lines that we're talking about as they were working in soft tissue, being able to say, "hey, that's something you shouldn't cut and we're not going to let you go that direction." But they talked about lane assist kind of putting up guardrails like a lot of, I think the terminology and I was in the investor track of the meeting. So I think that everybody was really trying to keep it nonscientific for all of us to be able to kind of follow along, but it did help. Like it helped me go like, oh, I understand, like why this is so valuable, like how that's that's helping out so much.

Justin Banutelle [00:15:09] It's removing risk as opposed to scaring you.

Dr. Roger Smith [00:15:13] The training simulators for the da Vinci robot have had that kind of lane assist feature for a long time, because they know what the model is that's in front of you. And they know that the blood vessels or the nerves that you don't want to touch are in a specific place. And so you can put them in a mode where it says don't cut here because that's where the nerves are, you don't want to touch. And now we're, we're talking about, well, if you could put deeper imagery into the robot, it could do the same thing with live images. So you start seeing that.

I used to watch Dr. Patel do prostatectomy after prostatectomy. And there's a part of the surgery where you're approaching a wall of tissue and there's a thing in front of you called the tissue plate. And it's a line where the tissue will naturally part. You don't have to cut the tissue, just push it apart. And I say kind of like pushing the slices of bacon apart. And, you know, I'd be standing next to him and he'd do the surgery and said, "okay, so you see the tissue plate in there?" And he reached in with his instruments and pulled it apart. But the truth was, no, I could not see the tissue plate. Right. Even after he did it, I was like, I did not see that. And talking to the young surgeons, the fellows who are working with us, they would say the same thing. They were like, "I can't see it yet either. I'm still learning."

So putting that kind of feature, giving that to AI and letting that AI point out that tissue play would be another really useful thing for younger surgeons. The pros like Patel and those other guys. Right. Like I don't need any of this. Yeah, but you're one one out of a thousand, right?

Michael Roberts [00:16:59] The whole concept of, you know, democratizing surgery like that was definitely like a refrain that we kind of heard over and over. And I think one of the other things that I definitely heard some talking about was this concept of just what you're talking about there, like the pros, the experience, people that have been there, they already know all

this stuff. They don't need the same type of guidance. They don't need, you know, sort of the same level.

I think about video games. So I have a 16 year old son and sometimes we'll play the same game. I'm now 40, 42 I think. So my reaction times are a little slower than what his is, and the way that he has to kind of like go, "no, dad. Like this is how you do it," you know? And, it has to kind of walk me through. So like the level of interaction that he has with the sorts of tools that are built into the game, of the way that he modifies his video game for it to be fun for him and for it to be useful for him is drastically different from what I need, which is the slower man trying to keep up kind of my. You know, do you see those kinds of like difficulty settings, experience settings, kind of like being like an option that people can turn on, turn off and devices going forward?

Dr. Roger Smith [00:18:05] I don't know, I could see having a standard now. No, maybe not. I can think of the regulatory and legal implications of that, where if you had a feature and you turned it off and then you made a mistake, you might get into hot water. It's hard to imagine you can choose not to take its advice, but to turn the feature off if it was deemed helpful. That seems regulatory difficult. Viability difficult.

Michael Roberts [00:18:34] Interesting. So where do you see AI going in the future? I know you've, you've done some, you know different speculation in your fiction, but where do you see this kind of unfolding and how quickly do you think we're going to be able to get to this process? You know, is this a year or 5,10? Right. What are we looking at?

Dr. Roger Smith [00:18:53] So yeah, let's do two steps, one in the near future and one in the far future. So in the near future, I think we've kind of hinted at that. So dealing with imagery and data that's collected before the surgical procedure, doing analysis, doing planning, I think AI can be very assistive right there. And I think some of that can be done without FDA regulation. I'm not an expert in that. Since you're not touching the patient. I don't know how true that is, but it's certainly safe and not injurious directly.

And then post surgery, there are thousands of surgeons doing procedures and recording the data streams and the video stream, and all of that can be analyzed to find out who's most effective, what leads to the best outcomes, which movements or little decisions lead it down a bad path. So finding that out and then starting to publish that and distribute it. So all the surgeons know that the data says that you shouldn't do this or you should do that. I think before and after surgery, there's a lot of benefits to be had working with that data. And it's less risky.

Justin Banutelle [00:20:10] Yeah, that one's really fascinating. I hear a lot of that with a lot of the customers I work with and the obstacles. Everyone's hungry for that, both in the hospital systems and in the device companies. But it's marrying that device data to that actual patient outcome data, which are in two very different systems. And the legal challenges of authorizing, reviewing that at such a significant level. And like it can be anonymized, but then it's still like who's handling the like, piping of that anonymized data through back to analyze? But it's fascinating and everyone's hungry for that, I think, because it really does prove out and improve outcomes and justify the expenditures in this space. So yeah, that really resonates with me, what you just said there.

Dr. Roger Smith [00:20:57] Yeah, that's true. When I was with Advent Health, we had a big project to collect all of the data on millions of patients that were in the system, but the data had been entered into different computer systems, different EMRs. Some of it was still paper, and there was a huge effort to try and bring it all into the same system. So we could do that kind of analysis. And this is not related to AI, not related to robotics. It was a data analytics project. Try to get it all in so you can ask questions about best outcomes, best practices, the best financial practices of a surgeon group or something. Along with that came the question of well, when the patient signed their releases, they gave us permission to do certain kinds of things with their data. They didn't give us permission to do everything with their data. And so the people who specialize in that are like there's another minefield besides the technical minefield they're going to have to work through before you can do everything you want with that.

So that was the kind of near term analysis. So when I started writing these fiction books, the intent was to take the discussions about near future technologies that everybody's talking about at these conferences and create a story where those become real. So to say these really are things we're trying to create and now they're real. One, how interesting of an adventure story can you write around that? And two, what are the implications to the surgeon and to the health care system? What kind of trips are going to happen along the way if that starts to happen? And an obvious one was, in the first novel, I had the emergence of an AI assisting in robotic surgery, where the AI is equally as good as the human surgeon. And the AI can do everything the surgeon can do, but that it can do it faster. And the human surgeon still had to be there to step into control when necessary. And occasionally you would run into a situation that the AI hadn't been trained on, so something that were not enough cases for it to learn from. So the human had to step in their judgment.

But to the point I was wrestling with was what happens to the surgeon's ego and their role in the health care system when there's a piece of software that can do everything they can do? How prestigious are they now? How necessary are they? What does it do to their internal self-worth when they go home at night and go, "Am I even needed anymore? Am I just like a bus driver in a giant Tesla controlled bus where I only have to step on the brake if there's a child in front that blends in with the pavement" or, you know, something like that. So we wrestled with that impact on the surgeon.

But then I also had a young resident just coming in to practice with a very low level of skills. And her experience with the AI was completely different. She didn't see it as a threat, she saw it as a partner and something that could help her level up faster. And so she was scheming on, "I'm just getting started in my career. How do I build a career where the AI is my partner and I use that as an advantage in my practice?" So I tried to have those two different experiences in that first book.

Michael Roberts [00:24:34] Interesting.

Dr. Roger Smith [00:24:35] Then when I wrote the first book, I actually published it like a month before ChatGPT came out. So I was just getting into the marketing phase. ChatGPT came out and honestly, it took all of us by surprise. The power of it was really surprising, and it's only gotten better in the last year. So when I compare that to the story I was like, do I have to rewrite the story because I said it in 2050 and like maybe this should happen in 2040 or 35. And of course I decided that I feel like as soon as you rewrite it in 2035, there's something new that will come out and tell you what's going to happen next year. So don't change that. Just let it go.

Justin Banutelle [00:25:23] Yeah. I mean, so much of what you're saying, right. And that's really impressive that you kind of forecasted that because that's so much of the conversation happening now. Someone we had a while back, Michael, I think said that ChatGPT isn't going to take your job, but somebody who knows how to use ChatGPT is going to take your job. And it's that kind of idea that reminded me of what you were saying, like, this idea of this young surgeon and up and coming and what advantages can they acquire by leveraging these technologies, whereas somebody who steers completely clear of it, may end up falling behind?

And we work more specifically in the software development side of things, and that's constantly being heard in the development spaces as well, oh, no like ChatGPT is going to or like some kind of like AI is going to take your coding job and it just changes the landscape of what you as a human can bring to the table. But yeah, I agree. I think that leveraging it is going to be where the advantages are.

Dr. Roger Smith [00:26:22] And we've seen so many analogies that are so close to that already, like graphic artists. I mean, what if a graphic artist said I refuse to use Photoshop because it takes over, I don't get to do freehand stuff. That's right. You're going to get run over here, right? Even if you look at surgeons, when the robot was relatively new, everybody was in laparoscopic surgery. And then we got the robot. And let's just limit ourselves to urology and prostatectomies. So you got the robot, and you have some surgeons that are like, "I'm going to embrace the robot and I'm going to see where this takes my career." And you had other

surgeons that went, "No, I met I spent 20 years mastering this procedure and with laparoscopic tools. I'm going to stick with them." Well, then you move forward ten years, and it's the human with the new tool that took your job. Not the tool itself.

Michael Roberts [00:27:25] The new standard of care. So you talk about the field continuing to evolve. And one of the things that, I'll be honest, I just hadn't even heard of the concept before I went to this meeting, was this whole idea of telesurgery, of being able to remotely do these procedures across continents, even if that doesn't turn out to be the main use case by any stretch. But it was just such a fascinating concept. This is another idea I've been kind of bouncing around, you know, since I came back from the meeting. I was like, you know, they can do this now. This is so crazy. And everybody goes, oh, I don't know about that. The first thing everybody was worried about is, what happens when the next the network messes up, or what happens when something goes wrong? And how do you handle all that?

Justin Banutelle [00:28:03] From a security standpoint the amount of rigor you need to apply when, yeah, it's far more vulnerable too. Yeah, for sure. If you're doing it for sure.

Michael Roberts [00:28:14] It's not something you want messed up. Assuming that we just handle all these problems and I know there's I'm glossing over a ton of stuff to even, like, get to that leap. Where do you see this kind of, like taking hold in the US and our specific health care market, because it's one thing to say, hey, look at how they're doing this in China, where there aren't enough surgeons in the western part of the country to handle these complex procedures. Theoretically, as of today, there are enough surgeons to handle everything. How do you see that kind of playing out here?

Dr. Roger Smith [00:28:45] So we've been playing around with telesurgery for a long time. When the Defense Advanced Research Projects Agency, when DARPA started doing the research that created the da Vinci robot we have today, their goal was telesurgery to the battlefield. That's why they did the work. And they were able to make all the parts of the machine except for the reliable network. And so when they ended the project, they're like, "in a way it was a failure." But Computer Motion and a couple of other companies that became Intuitive saw a way to put it together to create what we have today without the telesurgery. So I think our, at least in the US and Europe, are healthcare models for the country. They don't really call for telesurgery or they don't have a need for it that would drive development and investment and purchases and all of that.

I think if telesurgery is going to happen, at least in the West, it's going to have to happen first in a military environment. So we're going to have to have a war that happens where we need

surgical skills closer to the battlefield, and telesurgery is the only way to do it. And after we've done several thousand surgeries for soldiers and we see that we save this many lives and we save this many limbs, that that can propagate backwards. And then you come into the US and you say, "are there any cases here we've kind of been ignoring?"

And in my session, not when I was speaking. I was the chair for a three hour session about military, NASA, and austere environments using telesurgery. And in that session we had one person from Nebraska. He was a researcher at a university there, and he said, "I have interest from the state government of Nebraska in telesurgery because literally we have two large cities in the whole state, and most of the population is a long way from those two cities." And so putting them in an ambulance and driving them 3 or 4 hours to the hospital is cost-prohibitive, and it could be dangerous for them. So we'd be interested in tele surgery just around the state of Nebraska if we could arrange it. And so we discussed that a little bit.

I grew up in a similar part of Colorado, where it was a four hour drive to Denver, where the real good surgeons were. And there were literally friends of my parents who needed surgeries that they would put in an ambulance and drive them either two hours to Pueblo or four hours to Denver to have a procedure. And, you know, that's just so backwards. And then they were like, okay, you're done. You spent your couple days in the hospital. How do I get back home again?

Justin Banutelle [00:31:46] And if you have a complication, how do you get back again?

Dr. Roger Smith [00:31:50] Yeah. And it wasn't that those little towns didn't have a good surgeon. There's no surgeon at all, not a general surgeon, nothing. And many of them, they don't have an M.D. at all. They're using a nurse practitioner as their primary provider. So I don't think those small town environments will trigger the use of telesurgery, because there's not enough money there to build these systems. I think it's going to have to happen in a well-funded situation like the military, so that the tools can get built, and then the idea and the working tools can roll back into the civilian world. I don't see any other way to get there without some kind of bridge that involves the government.

Michael Roberts [00:32:33] Can a company out of Japan, out of China, out of India, be the ones that figure this out? And then, you know, they are able to make advances into the US where we don't have, you know, none of the companies here have that kind of network setup.

Dr. Roger Smith [00:32:47] Yeah. That's a good idea. Speculation. I see why not and not why. Technically, I think they could create the system, prove it out, build it, and be like "We have this. Would you like to buy it in the US?" You and I were both at SRS a few weeks ago, and we

noticed that the Chinese and Indian companies that are offering systems, are offering systems that to us appear to be direct copies of the da Vinci. So there might be legal barriers to selling that system in the US because of the way it was built from the beginning. That's the only thing that I could see holding that back.

Michael Roberts [00:33:28] Gotcha, gotcha. Interesting. Dr. Smith, I could keep peppering you with questions, I think, for another hour or so. This is great. I thank you so much for coming on the show today. Where can people find you online? Where are the best spots for them to go if they want to know more about your work, your fiction?

Dr. Roger Smith [00:33:44] So the best place is my author website which is rddsmith.com. 2 Ds in the middle. And that's where these novels are and that's where I communicate with people and things like that.

Michael Roberts [00:33:58] Awesome. Very good. Well thank you so much for joining us. We really appreciate it. And for everybody that's listening, you know, just, you can go to the hc.show for previous episodes and let us know any thoughts you have. Thanks so much.