I'm Nathan Rowland.

I work at MUSC.

And I'm one of the neurosurgeons on faculty here.

Today, I'd like to tell you about a very special case of deep brain stimulation and a new way that we're doing that at MUSC.

This patient was a very special patient.

He came to me with complaints of severe tremor.

But it was so severe that he could not feed himself with either hand.

So to eat, he would make sure everyone is out of the house.

And he would eat as what he described as like a dog, meaning he would put his mouth near the plate, or whatever he was eating out of, to eat.

And so he was very embarrassed to eat.

So he came to us after having been turned down by other centers.

And we agreed to help him.

And he was one of our first patients using this new technology.

He has essential tremor.

And so we don't know exactly what causes essential tremor.

There are some genetic elements.

Some of it is inherited from your mother and father.

But essentially, it is the brain not being able to control the limbs in a smooth fashion the way you and I do.

So the limbs oscillate back and forth.

And that's the tremor that we see.

Now, this technology has probably been around for 10 years or so.

But the platform that we're using is a new kind of frameless platform.

So what we're using is a type of deep brain stimulation surgery called frameless DBS.

What happens is that the patient comes in to get a CT scan.

And we place several small screws where the platform will sit eventually.

The screws are placed in the skull by me.

And it's based on where I think the electrode will eventually go in two weeks when they have the real surgery.

So I put four screws surrounding that spot.

And then the platform has four legs that will eventually sit on those four screws.

After we put the four screws in, they get a CT scan.

Then that CT scan gets sent to the company to make the platform.

And then they send it back to us sterilely.

In the old days, the way we would do it is use a frame bolted to the patient's head in four places, two in the front, two in the back.

And that frame is what patients often refer to as the worst part of the surgery.

It's the part of the surgery that they hate the most so that we've replaced that now with the small frame that gets then shipped back to us.

So when we get in the operating room, the patient comes in the operating room.

And we just simply place the custom made frame for that patient onto their head and screw it down and then start the surgery.

So the way that you correct it is you put an electrode in the area of the brain, area of the brain that's in the thalamus, which controls lots of things.

So it has to be done very carefully.

But if you can get this electrode in the right place, it will completely stop the tremor instantaneously.

So we get to actually see this in the operating room instantaneously before the patient actually leaves the operating room.

Yeah, so the patient is awake.

And he's awake for that exact reason, which is that we need to see the tremor before and after we stimulate the brain to know that we're in the right place.

We have a big team working with us to try to do a-- perform a surgery this way.

First, there's me.

And so I'm the neurosurgeon that does only the surgery part of it.

So I'm in the back of the patient's head, fixing and securing all the electrodes and various things that we need to put in the brain.

But then, there's the neurology team that actually looks at and hears the recordings.

They tell me where to go if we need to make some slight adjustments to the back or to the front, to the right or to the left.

And so they're instrumental in helping to not only examine the patient, examine the tremor, but also, they're giving me some feedback as to where I've put the electrode.

We have anesthesiologists that are monitoring the patient so if the patient gets too sleepy or is in pain, we can modulate that.

There's a big team in the room.

So the neurologists are measuring the amplitude of the tremor, how high the tremor is, the frequency of the tremor.

That tells us a lot about the kind of tremor that we're trying to treat.

And there are certain tremors that are best for deep brain stimulation.

And this person's tremor had the right characteristics for that.

Once we implant the electrode and then we turn it on, there are several nuances to test with that.

So one would be, we may treat the tremor and the tremor may stop.

But are we causing harmful side effects, such as motor pulling of the mouth or the tongue or the eyes?

And if we detect that, then we may want to think about placing the electron in a different place that will only treat the tremor.

So those are some of the things we're looking at.

And then, what we want to do is the electrode has four contacts on it, so we test all four of those contacts to make sure that we know which contact provides the best tremor suppression.

So they're looking at the tremor very carefully and in great detail and measuring at what amplitude, frequency, and pulse width of the current that we're delivering will give the best tremor suppression.

Now the tremor that the person has is called an action tremor.

That's very specific to essential tremor.

And so we, actually, sometimes, we'll have them get a bottle of water that's capped and ask them to put it to their face like they're going to drink it.

And so, that's another way to functionally test whether this is something they will be useful to them when they're trying to eat and drink foods and liquids.

So the patient's prognosis is very good.

He already actually had one side done.

He had the other side done.

He got excellent tremor relief from that.

And so the tremor relief from the other side should be just as good.

But now he can go to church, go to all of his social events, and have no embarrassment whatsoever.

And he also has a large extended family that support him.

And so, now he can do those things and have dinner at home without feeling embarrassed.

That's great.