JOHN SHIELDS: I am tried and true, posterior total hip arthroplasty. What I'm going to talk about it is a little different. What we do-- I am here at Wake Forest, I am as a minimally invasive, as a tissue sparing approach to the total hip replacement. I am of no disclosures.

First I'm going to tell you a little bit about me. Just so you know where I'm coming from. I'm John Shields. I am a joint surgeon here in the hospital. I am grew up locally, in Danville, Virginia, about an hour and a half up the road. I did all my education in Virginia. I am an undergrad at William and Mary Medical School at UVA. I am in a residency here, I am here--

I've been here a long time. I am in a fellowship up in Boston, in New England Baptist Hospital. I am on staff now, here, a little four years, I have had the pleasure and the privilege. I have seen all my patients in clinic. I'm out here at Davy Medical Center.

I look forward to doing our surgeries. I am over at plaza three, which as you saw as you drove in, they're in the process of building. And we actually had them hold off on knocking out that back wall, there. They're about to knock it all, they were planning on doing it this weekend, and we asked them to, please hold off a couple of days for us to have this symposium.

If you haven't picked up on it yet, I do stutter. A little known fact. So please bear with me as I give this talk.

That slide is one of my favorite slides on stuttering. But anyway, I'm going to get going here on total hip replacements. If we're going to talk about, where we are on total hips, first, we have to talk about where we've been. And it is a long, very interesting history on total hip. The first attempt at a total hip replacement, was way back in 1891.

Professor Gluck, in Germany. He used ivory to replace the femoral head. It was destroyed by TB. Way back when, he did not do very well. But, it was a good attempt. Later surgeons made attempts at putting new soft tissue interposition, in between the arthritic head, using fascia lata, pig bladders, skin, in between the arthritic surfaces. It did OK, and I guess better than it was, but obviously not a very good option.

The first attempt in this country, was almost 100 years ago. As American surgeon Smith Peterson. He made the first arthroplasty out of glass. I'm sure everyone in this room is saying that sounds like a terrible idea. It was a terrible idea.

It failed miserably. It fractured the-- there is a force of the body, every pound of weight on the body is three to six pounds of weight on the joints. It broke and it shattered, and it failed miserably. He later tried metal, and it did better.

Smith Peterson, if you know that name. Everybody hears about the anterior approach to the hip. The other name for the anterior approach to the hip is the Smith Peterson approach to the hip. So that is not a new approach it is a very old approach. He was the guy that came up with it. So it's nothing new.

Sir John Charnley in Manchester, he's the guy. He is the guy that is the father of the modern total hip replacement. In the 1960s, he invented the low friction arthroplasty. That is, in principle, is what we use today. It was a metal prosthesis, cemented into the bone, it used a plastic liner. He called his dental colleagues, and he took their-- he took the bone cement that they use in dentistry, and that's what he put into the bone with. And that is, in principle, what we use here today.

And so, what he came up with, and what he used, there have been a lot of iterations over the years. Some have done well, some have not done so well. We've all seen the ads, on TV, for the attorneys. Some have not done well. But, what we use here today, his prosthesis is the basis. It's a metal cup, it's a plastic liner, it's a modular ball, and just a mental prosthesis.

So a metal cup has a roughened back. Maybe a solid cup, has holes, for screws to hold that cup into the bone, temporarily. But essentially, cheese graters, to sequentially bring that cup up to size. Either one millimeter, less than the size of the cup, or either line to line. And it is a press fit. We take a mallet, smack that cup into the pelvis, and the press fit holds it temporarily.

And then, as you see in the upper left hand corner, is a microscopic view of the pore surface of that cup, and then bone grows into the back of that cup. Every company, every vendor, that you'll see if you pick up and you play with these cups, and you feel the back of it, the back of the surface is very much like bone. And bone grows into the back of this cup.

Each cup has a locking mechanism that a plastic liner, or a metal liner-- which has fallen out of favor-- or a ceramic liner, which we don't use often. Our go to is a highly cross linked polyethylene liner. It locks into this cup, and then there's a head ball which actually goes into this cup. Head balls are either cobalt chrome, a ceramic head ball, one vendor has an OXINIUM head ball, just a ceramicized metal.

The ball goes on a prosthesis. You know, prostheses come in all shapes and sizes, but much like the cup, has a porous surface, which that bone grows into. And then much like the cup, we actually ream-- broach up to size, with sequential broaching.

These prosthesis are sort of a wedge or taper, and it is wedged into the femur. That wedge, that press fit, holds it temporarily and the bone grows in and around this prosthesis. There are cemented prosthesis, that we don't use as often in this country. They actually used it much more often over in Europe. Just like Dr. Charnley did.

But this is what we do. This is extraordinarily common. There are about 2.5 million people currently living in this country with hip replacements. 4.7 million who have knees. Knees are much more common.

It is estimated by the year 2030, over 600,000 people a year are going to be getting total hips. And the number total knees is off the charts. Trends indicate that the age of people getting total hips is going down markedly. Younger and younger and younger people are getting total hip replacements.

My youngest person is 24, I put a total hip in. I think my partner's youngest person was 14. So younger and younger people, that's not the norm, obviously. But I've definitely seen a trend in my practice. It is not uncommon, us putting total hips in people in their 40s.

I think our technology is better, hips are lasting longer, and I think our patient population is not willing to live in pain. 20 years ago, our technology was not as good. Our bearing surfaces weren't as good. And people just aren't willing to live with it.

So, traditional posterior approach to the hip. What they were doing, not actually what we're talking about. This is a picture of out of Netter's orthopedic approach to the hip. Everybody has a friend, or has a family member, who has got this incision. This is an enormous incision, a 12 to 16 inch incision. And this is right out of the textbook. This is how a lot of people learn how to do total hips. I trained under guys who did total hips like this.

Big exposure. You see, you go in, and you cut your piriformis tendon, and your gemellis tendon, superior gemellis, obturator internus, quadratus. Intersciatic nerve here, here's your hip capsule. You go in, and you cut all the way across all that, and you take out a large portion of that hip capsule, and you throw it away. And you leave sort of a flap of that hip capsule in there. As you look, you're just making a clean sweep on that old approach, and you're just taking all this down.

Here is your blood supply, in the femoral head and neck. Here's your medial femoral circumflex artery. As an aside, people come in, and I have femoral neck fractures, this is the artery that we're always worried about-- if it's displacing, that fracture is moved, if that arteries gets disrupted, those are the people getting partial hip replacements. know If it's just a non-displaced fracture and that artery is not disrupted, then they're just getting no screws or fixation.

But, as you see again, out of Netter's, huge, huge approach to the hip. Everything is just stripped off the back of the femur. They're taking out part of that hip capsule. And these patients, as you might imagine, have a lot of pain, limping for weeks after surgery. Have a little higher rate of dislocation. And so, as you are talking about a posterior approach to the hip, not all posterior approaches to the hips were created equal.

What we're talking about here today, is a minimally invasive, tissue sparing approach to surgery. Minimal soft tissue disruption, spare the piriformis tendon, not taking out any of that hip capsule. It's into the cage, repairing it anatomically. Meticulous wound management, good blood management, multimodal anesthesia, which we'll hear about later on today. And getting those patients up, day of surgery, which you'll also hear about later on today.

And so, what I'm going to show you-- if my mouse will work-- is sort of how we do this operation. As minimally invasive as possible, to get these patients up and moving quickly. Good hip on the right, bad hip on the left. Bone on bone hip arthritis, there's no joint space at all on the side. It's posterior approach to hip, patient's laying lateral on the table. Here's anterior trunk. Here's a vastus ridge, posterior trunk in back. Tip of the troch up top.

And so, a pretty small incision, that's about 4.5 centimeter incision. You make the incision, cut through fascia. And people ask me about splitting muscle, cutting muscle, all we're doing is just splitting that g-max with our thumbs, in line, with [INAUDIBLE]. We aren't cutting it with any knives, or [INAUDIBLE].

Then we're actually going in off the back of the troch, and we're not cutting piriformis tendon. We're leaving piriformis alone. Here's the edge of the piriformis here, that we're leaving alone. We are not messing with it at all. We are taking a few of the short external rotators. Here's our osteotome going underneath. Underneath minimus, underneath piriformis, and you see capsule down below.

And now we're just taking down capsule, but what you'll notice is, we don't actually take out any of the capsule like they do in other approach. Here's that arthritic end, see those big osteophytes, or bone spurs. No capsule gets taken out, it's just one single cut. We sort of open it up, almost like zippers on a pair of pants. And it just closes back down, almost like zippers on a pair of pants. Nothing gets taken out or thrown away.

And once we get exposure, it's dislocated-- is exposed, there is a preoperative template that has a ruler that actually shows you exactly where to cut, to the nearest millimeter. Then we make our saw, make our cut there at the femoral neck. And everything is done based off of our preoperative template.

Here's your bone on bone arthritis, with all that cartilage going off the femoral head. Here are the cheese graters we were talking earlier. That we bring that cup up to size.

It is a sequential reamer, of to size. Because, you see, we take a mallet, and we have these external guides, that you use to judge your abduction, or angles, and you literally take a mallet, and smack this thing into the pelvis. And that's why patients are sore. And you see our holes in there. And then we put-- already put some screws in, I am against paranoia. You don't necessarily need them, but just be safe.

Here's our plastic liner, it has a locking mechanism. Just have the cup. You take a mallet, you it engages your locking mechanism. That should go to the femur, this is just a canal opener, it opens up your femoral canal.

Then you take these broaches, and you'll see the broach, it has these little teeth on the outside of the broach, that actually opens up your femur. The broaches go up in size. One, two, three, four. Sequentially broach up.

We've done a pre-operative template, we have an idea of the size that we want to get to. It's a mallet and a broach, it's like a rasp. We go up inside until we get [INAUDIBLE] which you'll see in the top layer.

And we just keep going up, until have a tight fit. The goal is that this implant is all the way out to the side, to the cortical, to the hard bone, and then it is a wedge that it is slammed in there tight, tight, tight. We trialed this prosthesis, make sure it's a good fit. I trial it off the broach, because these implants aren't cheap. You trial off the broach, to make sure that you like the trial. If you like the trial, then you open up the actual real thing.

Here is the trial part. Trials come in all shapes and sizes. And then here's the real prosthesis, and you see, here's this grit surface here.

Here's our ceramic head ball. The ceramic is a little better, it's more expensive. It has a better wearing surface, it wears better.

In theory, in our younger, active, patients, it's going to last longer. It is made of ceramic, so there is a chance it could fracture, it could break. Chances are better of being hit by lightning that having that thing break. But, you know, there's a chance.

You see all that irrigation. We are always irrigating, keeping our tissues moist. Then here's us closing our capsule. As I said at the beginning, open our capsule up, close it down-- close it up. Almost like a zipper on pants, we aren't taking any tissue out. Putting it back anatomically, exactly how we found it.