Hello, and welcome to this live webcast from New Albany, Ohio. I am Dr. Mike Polson. I am an orthopedic surgeon at the Cleveland Clinic, and I like to thank you for joining us this evening as we present the Oxford Partial Knee with the Signature Personalized Care Guides system.

Joining me today is Dr. Keith Berend. Keith is a orthopedic surgeon here at the New Albany Surgical Hospital, and he’s well known to us. He was introduced to the Oxford system in 2004 when he was one of the original surgeons to travel to Oxford. And since he’s returned, he’s done over 3,000 Oxford procedures, and he’s sharing his time here with surgery tonight. Keith, thank you for joining us.

Thanks, Mike, and I want to share my welcome to the New Albany Surgical Hospital here in New Albany, Ohio. I want to certainly thank my staff for staying around into the evening tonight to show you this Oxford Partial Knee with the Signature Guides. That includes my PA Mike Thomas, our Fellow, Adam Bergeson (sp), our esteemed anesthesiologist and CRNA Merwin (sp). I have my scrub tech Matt. The nurse Chris is helping in the room. And our man Chuck, who sets everything up for us and does a great job of making this operation go seamlessly in terms of positioning and prepping and draping.

If we go up to the x-rays real quick to get this game started. Mike, you can see the four views that we standardly use to evaluate a patient for partial knee arthroplasty. Firstly you’ll note that the patient has undergone a partial knee on the right, which is well functioning. But you’ll notice a few other things. First, we have a standing view of both knees and you’ll see bone-on-bone arthritis in the medial compartment. This is not a pre-arthritic or a pre-total knee, this is the end stage treatment of end-stage joint disease. Next to that you’ll see what’s called a valgus stress x-ray. You can see the lead hand pushing that knee into valgus. This is a well-performed valgus stress x-ray where the kneecap is in the center of the knee, and you can see complete correction of the varus deformity with maintenance of the lateral joint space. And that is critical, Mike, for any partial knee candidate we want to see this bone-on-bone arthritis medially on a standing view, and then a fully-correctable deformity.

If we turn our attention to the bottom two view, you’ll see an axial view of the patella femoral joint. In this case it appears to be relatively normal, but we have learned through many years and through the teachings and research that’s been done, we can nearly ignore disease in the patella femoral joint with the exception of lateral compartment evernation and grooving.

And then we see the lateral x-ray, which is very important to me because I’m looking for intact bone and cartilage posteriorly with a central or anterior defect on the tibia, really the hallmark of what’s called anteromedial osteoarthritis.

So this patient meets the clinical indications. He has failed conservative treatments. This is a 79-year-old male. He’s five foot ten, 157 pounds for a BMI of 24. So, Mike, what are your thoughts on sizing and implant considerations with height and with what we see on the x-rays? Look like good indication so far? So far, perfect indications, Keith. A question comes from his height being five-ten, does that give you any indication as to the possible size consideration for the prosthesis?

Yeah, so we’ve noted that – and there’s a rough guide – but obviously shorter women are going to be a small, or even an extra small, taller women will be a medium, shorter men will be a medium, taller men
will be a large, and then the real large men maybe an extra large. So there’s no extreme cutoff or severe cutoff, but someone who is five-ten, I’m thinking about a large. We’ve template this x-ray, it looks like a large, and then you’ll see on our Signature Platform, when we do the preoperative templating and planning using the Signature Guide System, we were able to confirm that this is likely a large implant. All right. So from this patient’s height, you would suggest that he’s probably going to be a large. Let’s look and see from the Signature Guide System, what that has suggested. We certainly can look here, and that’s the model that we have with a large femoral component templated, and we can see as we turn that, Keith, it really does look like the femur fits well for the size large. Would you agree?

Yeah, I would agree, and what we’re really looking for is on that posterior view of the femur you see that the implant is not really overhanging. If we go to a medium, you can see some underhang there. You know, Mike, that all of the implants that were done until the mid-90s were all one size, they were all medium, but it certainly reduces the risk and makes the operation easier to get it matched, as we’ve done here.

Certainly it looks like the femur, they agree with you, that the femur should be a large. Again, looking at the tibia, is there a relationship, Keith, that you use between the size of the femur and what you would anticipate the size of the tibia being?

Absolutely. So, again, it goes with men are going to be usually a D or an E, women are going to be an A, B or C, depending on their height. Occasional small man might be a C. But if you’re putting in a large femur and you cut the tibia and it looks like it might be a B, or if this templating system comes up with something that just doesn’t make sense, then you just know that that’s not right. And it’s very logical. Although because it’s a sphere, perfectly congruent sphere on a perfectly flat surface, any femur can go on top of any tibia. So that’s not the real important thing. The real important thing is maximizing surface area and coverage of the tibia by, as you can see on this model on the computer, getting right into that spine of the ACL, that medial spine of the tibia.

And I think, Keith, that it’s become more important as we’ve done these over the years, that we get as much surface area as we can, and we are just encroaching on that spine and yet not getting into the ACL. This system allows us to know what the anatomy is before we get there, do our template and planning preoperatively unlike intraoperative navigation or robotics where there is something telling you what’s going on during the surgery, this is all planned out ahead of time. It makes things more efficient and certainly streamlines the operation.

Just for a moment let’s go ahead and downsize that tibia one on the model and see where that gets us. Yeah, and we look at that. Clearly, if we were going to put in that size tibia, we might have made a resection that might be a little bit more medial, and if we were to do that, so if we shift it over medially, you’ll see you’ll get better coverage, but you’ve got a smaller surface area. And we want to maximize the surface area, and so I think this is probably going to be an E. Now, remember, Mike, this is – we can shift sizes intraoperatively, particularly on the tibia side, and we’ll show you how to do that. We’ll show you how to do that in the femoral side as well. So this is not the end all, be all, this is particularly for alignment of the implants within the bone, placement of the implants within the limb, has proven to be very, very accurate.

But this system certainly does help us get everything appropriate into the mechanical axis. All right, we’ll let’s see, let’s get started and see how you do this. So I’ve made just an abbreviated median parapatellar arthrotomy here, right along the aspect of the medial side of the patella. We’re going to go from the superior pole of the patella to just above the tibia tubercle.

I’m going to excise the fat pad and any scarred synovium that may be anterior. Importantly, one of the real hallmarks of the 35-year history of the Oxford Knee has been that we’re doing this operation, we’re not going to do any ligament releases. Remember, we showed that stress radiograph. It’s a fully correctable deformity. All I’m going to do is release the anterior horn of the meniscus and anterior capsule.
here to allow me to get my tibial cutting guide on. I’m not releasing any MCL. That is critically important. This is a correctable deformity, and we should not have to release anything.

We look in the knee. We can see a completely intact and normal ACL. See right there. Right, we have a good shot of that, Keith.

Okay. Patella femoral joint is normal or near normal, as we suspected on our x-ray. And you can usually peek over laterally, at least maybe feel it with your thumb, or you can take a quick peek laterally and see and confirm that that’s normal. But with a stress view that looked as good as the one we saw there, Michael, I’m not too terribly worried about it.

So, with the Oxford Signature System, we’re going to do the femur first. And so basically this is a bone model that comes with the kit, okay. And this guide is actually snapped on here relatively well. This guide is templated off of the computer software that we just demonstrated. Okay. You can see the placement of the holes. And then this is going to come from extension into flexion and lock onto the femur. And you want to practice it a couple of times on the model so that you can get a feel for how it’s going to lock in and how it’s going to feel on the patient. So we’ll do that.

And just to emphasize, Keith, certainly the model that you were trying it on is a model of this patient’s knee.

That’s exactly right. And if you’ll notice, I’ve brought this knee from extension to flexion, and this thing snapped on. We call it registering on the femur. And it snapped on. You can look through the little windows and see that it’s right down. This is an MRI model, and so it’s based off of the patient’s (audio break). We look down the center, we can see that these holes are going to be centered right in the condyle. As we noted, we templated this to a large. It looks like it’s going to be a large. However, this system will allow us, intraoperatively, unlike other systems, to change our sizing if we feel that’s necessary. So right now I’m using a large, okay. On the bottom it’s gray and says Large Plan. So we planned for the large. And on the front it says Large Drill, so it means we’re going to plan for a large and do a large. If we looked in here and this guide appeared to be very small on a very large femur and we thought we wanted to go up a size, or if our templating suggested going up a size, we would use the Large Plan, because we planned for a large, and then we would go up to an Extra Large Drill. And this shifts the holes and changes the proportion of the holes so that we can go up or down a size intraoperatively.

Same thing here. We’ve templated to a large, so it’s a Large Plan. If we want to drop down a size, we would put in the Medium Drill. And you might do that if it looked like you were proportionally wrong, or if the Guide showed up and it showed a large but it was a patient who was five foot four or something like that. Very uncommon, but it does give you the latitude intraoperatively to, you know, use your brain and be sure you’re doing exactly what you think is best.

Good demonstration, Keith.

So, large-large, okay? And then we do have, if we go to the side view, we do have this alignment guide. And what this is doing is it’s simply going to check our alignment. Are we doing something strange? Does it look like it’s right? And we should have about ten degrees of flexion of the implant as we look up here at the top. A little bit up more. There you go. About ten degrees of flexion of the implant. Okay, with it held steady. And then we look up and down. It looks like it’s perpendicular to the long axis of both the femur and the tibia as it’s hanging here in normal position. And then rotationally, it appears to be rotated correctly along the axis of the femur. So that just checks our alignment, little alignment checker that we lock into the top of that guide.

Now we go ahead, and we’re going to drill. Again, we’re staying with our large size. We like that. We templated large. He’s five-ten. We drill the top hole, leave that in. We drill the six millimeter bottom hole. And we’ll come in and out a couple times because that’s going to be where we’re doing our milling. And then we’ll take these out.
Keith, have you always wanted to put the femoral component in flexion?

Yeah, so that is something that has come along with our evolution into the twin-peg femur of increasing the flexion. I’ve always tried to flex it slightly. Let me draw your attention to this real quick, Mike, while we’re talking about that.

Yeah.

If we look at this view, you can see these holes are directly in the center of the condyle. There’s going to be no overhang. And it looks exactly like our model. So here, you can see with – once we get rid of this osteophyte, it should look like it’s right in the center of the condyle, and lo and behold, it’s right in the center of the condyle.

Very good.

Also to note, it’s templated to take seven millimeters of bone and cartilage off the back, which is the thickness of the actual large implant.

This is a femur-first technique, unlike the standard instrumentation with the new Microplasty, so we’ll place our femoral cutting guide on. Okay. We’ve got an MCL retractor. This is a captured cutting guide. It matches the size. It says Large. You see that there are very few instruments that are needed when use this Signature system. It comes in a nice little kit, and you just use very few of the standard instruments. So the Signature system simply gives you a guide to use pretty much the standard implementation, right Keith?

That’s exactly right. It’s an alignment guide. So let’s look at this resected piece, and it’s exactly what we would show. You want to look at your resection piece off of your model, because we’ve got a model that you have there, Mike, that has the resection piece and shows just how thick that piece should be, and it should be seven millimeters, which is just exactly what this looks like.

Right, and –

What’s that look like on your model?

The piece that you took off certainly matches the piece that we have on our model.

Okay. Great. So now, if there is any residual soft tissue, you want to remove that. We are locking this guide onto the osteophytes, so we don’t want to remove the osteophytes, but if there is a little horn in the meniscus or some kind of caps or something, you want to get rid of that. Make sure we’ve got any fat pad out of the way that’s going to be in our way.

Now, Keith, when do you take the osteophytes off the femur?

I will do that actually after my milling.

I got you.

They sort of show themselves, and you’ll see that. Routinely I would take them out of the notch first, but that’s if I was using the standard instruments. So, we’ve got our tibial exposure, we think. You want to make sure the meniscus is out of the way if you haven’t removed it already. And then here’s our tibial guide. The tibial guide is going to mate or register, just like we showed you on the femur, and you can see the lines that are drawn on the guide that give us an indication of where that resection level is going to be, right along the spine of the ACL. It’s going to take seven millimeters if we use it standard, and I’ll show you how to adjust that, seven millimeters off the intact bone and cartilage posteriorly, which is the real hallmark of the Oxford. This is anterior medial OA, so this is normal bone and cartilage. We’re just reconstructing this with actually the thinnest construct available on the market because we have a three millimeter poly if we choose to use it. And then you can see where it wants to register on the face of the
tibia. We want to make sure we have that much exposure. And then slip that in, and it really – it registers and it really only wants to go in kind of one position there. So the first thing we do is drill our guide pin. And, Keith, it seems like you’re hold, you know, with pressure centrally. Is that right?

Yeah, I’m going to show you that. That’s a good point. So the way to lock this on, and you can practice on the model, but the way to lock this on is to push it back and then push it lateral. And it looks onto the face of the tibia, and it’s very, very stable as you can see, you know, it shakes the whole leg when we do that. Let me see the drill guide, please. So then the drill guide goes in, and importantly, you want to know if you’re going to use the Microplasty instruments or if you’re going to use the Phase Three instruments. We’re using the Microplasty, okay. And I’m going to use one pin, drilled in there. And then we’re going to use one pin that’s going to set our depth and protect our – protect this from overcutting the tibia. Okay. Keith, as you’re doing that, I want to remind the viewers if they have any questions in the application of this system, that we certainly – they can email in questions and I’ll pass them on to you and you can demonstrate or show them, okay?

Great. Yeah. So let’s go to the side camera again, just for a second, and we look out our view here, we should have seven degrees of posterior slope, which we see here. We can see that seven degrees of slope. Looks good. And then if we look at it from the front view, we can see that we’re absolutely parallel with the rest of the tibia, if we look at the top view there. Okay? So that looks good. Again, another check. We’re not doing anything that we can’t change. No step during this operation can we not change our minds and do something either with standard instruments or make an adjustment. So first, we’ve got this drill pin protecting our tibia. I’m going to make our posterior, or, excuse me, my vertical resection on the tibia. It should be right along the spine of the ACL according to our template. Okay. Keith, that guide makes it looks very easy, but that’s one of the tougher cuts to make when you’re doing this with other instrumentation.

I would agree completely. This cut can be very difficult to know where to go in space, and I think that is one of the big advantages of the Signature System, is, especially for surgeons who may have difficulty with that step, then you place your standard cutting guide, okay, which we have here. This is the Microplasty cutting guide, which you set as a default on your pre-op plan with the Signature when you’re ready to go. Okay? And it just locks into place. It came unlocked down here, but it’s going to lock into place. Let’s take that off for a second. There we go. And we just set that right where it wants to be. We know we confirmed our slope, and that looks good. Okay. And then we’re ready to make our resection. Now, this is a zero guide. Okay. If it looks like it’s going to take way too much bone, you can put on a plus two guide. You can also put on a captured guide if you prefer to cut through a captured guide. And if it looks like it’s not taking enough bone, which we’ll check here in a second, this one may – I may need to drop this one down. I templated it to put in a three bearing, so we’re cutting it close, as you might say. Remember, we want to take seven millimeters off the back. And that looks a little shy of seven. But that makes sense because when I templated this, we templated it to make a conservative resection so that I could show you the ease of re-cutting the tibia. We would take this guide off, this is the zero. And now it’ll take two additional millimeters of bone. I’m not going to do that right away. I’m going to mill this, check my gap first, and then see if I need to take additional bone. Okay? But that just shows you – of which we probably will need to. I templated it on the Signature to show that step, so let’s see if we need to do that. That’s a good point, Keith, because you can adjust it as you go.

And I think that’s a real benefit of this technology is that while it’s extremely accurate, it also allows you to be the surgeon. So let me finish the femoral prep here. This is a zero spigot. Now we’re going down the pathway of the Oxford and just milling with the zero spigot. Okay. We take any corners off that we may have created. You mentioned osteophytes, now I would take the osteophytes that sort of show themselves. Okay. We templated on the Signature software for an E, so this is an E tibial tray. And we’ll see how that fits. We can go up or down a size, it doesn’t matter. We haven’t bought that yet. Okay. And then we’ll try with our – this is the Oxford twin peg femur. And we’ll put that in. And as I mentioned, my suspicion is we’ll need to re-cut the tibia, but I wanted to demonstrate that. Normally you could take more tibia on your template, but let’s see if I was right on that. Here’s a three. And the three is too tight, okay, just as we suspected, so just like we thought, we’re going to take a little bit more tibia. And, again, we sort of planned for that to show you all of the attributes of this system, so you can definitely do your own
planning on the computer to make sure you don’t have to re-cut. And so we don’t want to cut the tibia so thick that we’re way down there in the bad bone. But, again, we’ve taken the – let me have that zero – we’ve taken the zero, or the standard shim, off, and that gives us a plus two resection.

We’ll just come down like that, and then we’ll come –

And you’re protecting the MCL very safely there.

Yeah, see my curly retractor there, that actually comes in the kit. Okay. And you can see we’ve accurately taken out a perfect little two millimeter piece of bone there, and we’ll be good to go now. Okay. If you put that guide on there, again, we want to use our head here. This isn’t just color-by-numbers, Ron Popeil said it and forget it. If you put that guide – I’m removing the hammer osteophyte or the anvil osteophyte. If you put that guide on there and it looks like it’s going to be too thick, we would place a plus two guide on, a thicker guide, on the top of that tray, to take two millimeters less. I can tell you I’ve routinely not had to do that. You also, if you prefer, you can use a captured guide to try and even make that cut a little bit more accurate.

And those are instruments on the standard Microplasty set, correct?

Those are standard Microplasty instruments, that’s correct. And that’s something you have to choose in your default on your Signature planning software is whether you want to use Phase Three or Microplasty. With Phase Three, you also can re-cut. You simply move the tibial cutting guide down. The only difference there is that Phase Three – I guess it’s easy to remember because it’s called Phase Three – Phase Three takes three millimeters of bone, which I find sometimes can be a little bit too much in the small women. If you’ve got a tight three and you take three, then you end up, you know, pretty far down the tibia, so I think there is an advantage with the Microplasty system to doing it that way.

Also, on the Signature guide software, you choose whether you’re doing a single peg or twin peg. The instruments are all the same, it just makes the image on the software a single peg or a twin peg.

Correct.

You can look at overhang and things like that. All right. So there’s a menisectomy.

Now we’re ready for our first real (inaudible) now that we’re confident of our tibial resection. Okay. That’s our E tibia. We haven’t bought that yet. We could change that if we want to at this point. There’s our large, but I’ll tell you, looking at the computer, I think it’s going to end up being that way. And here’s our three, and that goes in nicely. It’s a nice, loose three. It might even be a four, okay? Four is just a little tight. We don’t have to really decide. Now all we want to do, just like a standard Oxford, we want to match the flexion gap with the extension gap. So we’re a loose three, tight four, and in extension we’re – here’s a one – we’re a tight one. So a one in extension, four in flexion, we need to take three millimeters of distal femur.

And you, when you were measuring your extension gap, you were really flexed about 20 degrees?
Yeah, about 15 to 20 degrees. That’s right. You don’t want the posterior capsule to be tight.

So we’ll remove all the trials, including the tibial base plate. Okay. We’ve milled with the zero mill to make the condyle spherical, and now we’re going to mill with the three. We do that, we have four in flexion, one in extension. We need to take three millimeters of distal femur. We tap that down. And then, again, all the instruments are corresponding to the large, which was our final selection. We’ll mill three millimeters of distal femur. You can look through the little window, you can hear it change pitch as it’s buried. Okay. And you really cannot over mill. You can see this little three millimeter collar of bone around the spigot site there. You want to remove that. Okay. And then the corners of bone that are created right at the edge of the implant, bone interface. Remove those, medially and laterally. And then we’re ready to trial again. You know, Mike, are there any questions or comments about the Signature Guide System because, you know, just like any other instrument platform, we’ve used the Signature guides and then we’re done.
We’ve aligned our femur perfectly, our tibia perfectly. Now we’re just back to doing a standard Oxford. So while we’re finishing these few steps and balancing, are there any questions or comments about the Signature technology?

Well, Keith, it certainly seems that doing the femur first is no more difficult than traditionally doing the tibia first.

I think doing the femur first may be a little easier.

All right.

Getting that out of the way. It’s just – it’s difficult – the old instruments weren’t designed to do that. So here is extension. We’ve got a four. Feels pretty good. Okay. Flexion. All the way through range of motion, and then flexion feels pretty good. The four may be just a little bit tight and the three might be where we want to be. Let me make one other comment that’s important. On the algorithm, on the computer, I flexed this femoral component ten degrees which corresponds with the ten degrees of flexion that is in the new Microplasty instruments for the twin peg femur. Okay? We want to finalize or confirm our sizing. I have this little T handle that has a little nubbit on one side and a longer little finger on the other. I’m going to put this to the back of the knee, turn it 90 degrees, and then pull it forward so it’s up against the posterior tibia. And then I’m going to push the implant back to it to check the size. So we pull it up against the tibia, push the implant back. Frequently we’ll have one or two millimeters of underhang anteriorly. That’s perfect. We want to then peek over medially and look under the tibia, make sure that we’re not overhanging. And I like to just take this little finger and make sure I can’t flip up the implant. We want this to be on the cortex or overhanging by a millimeter or two. Let me see a D real quick.

I think it’s going to be an E, but let me show you what happens when you put in one that’s one size smaller. This is a D. You can see that it’s really underhanging. It’s not coming all the way out to the anterior cortex. There’s a large amount of underhang. And then when I peek over medially behind the MCL it’s underhanging by two millimeters. So an E is going to be exactly what the computer had suggested as our sizing.

And Keith, you want to keep that over to the medial cortex because that’s where the strong bone is for support.

That’s right. So, again, we’re going to go ahead with our E. We put the little finger behind the tibia, pull it forward, we’re going to tap it in with this bone nail. As silly as it is, Mike, one of the biggest innovations, I think, with the Oxford since I’ve been doing it for the last eight years or so, is this toothbrush saw. This saw is a parallel-sided round saw blade. And what this allows me to do is make my keel cut without overcutting and risking the posterior cortex, and very easy, very simple. We then take our little pick and make sure that hole is cleared out, that slot for the tibia. And it feels good. Okay. Now, in the long-term results in the Oxford starting some 35 years ago, probably the most critical factor related to failure has been impingement. It can cause dislocation, it increases wear, it can cause loosening, and it can cause pain. And so with the Microplasty instruments, they provide this impingement guide. And what this is is a shadow of a large femoral component with a captured posterior cutting guide that allows us to remove any osteophytes or overhanging bone posteriorly, and then you’ll see a calcar-type mill that we’re going use to remove any impingement anteriorly. So we placed that on and packed it. And so it goes down simply like that. Then we take this chisel, which is marked large, corresponding with the size of the femur, and that then removes any osteophytes or residual bone and cartilage posteriorly so that we get no posterior impingement.

That really is an innovation with the Microplasty that can’t be understated because many of the long-term results show that if there is no impingement, the wear is zero point zero two millimeters per year. If there is wear, that can actually triple – or impingement, I mean – it can triple. So very, very important. And then you want to get any of that bone or cartilage out of the back. And we’re ready for our first trial.
Here’s our E trial template for the tibia, and that’s going to go on there nicely. Unlike a total knee, everything we do here, we’re using gentle impaction, gentle pressure. And I’m actually using a light toffee mallet instead of a big orthopedic hammer.

Then here’s our twin peg femoral trial, same one we’ve been using the whole case. Femoral component loosening out of our first 1,000 Oxfords, we had one femoral component that came loose. So it’s not a huge issue, but it certainly adds to the stability in the operating room and the comfort post-operatively that this implant is going to remain stable.

In addition, it allows for more flexion because it’s a big longer than the standard femoral prosthesis. That’s exactly right, so it’s a true high flex component. We placed it at ten degrees of increased flexion. There is actually seven degrees of increased metal, so it’s as if you took a standard and flexed it three degrees, but then added metal posteriorly so that you can get into flexion, and while the implant is spherical, it won’t impinge, it does add to the surface area in flexion so it maintains a true high flexion congruency.

Also with the Microplasty instruments are these new trials. Everyone who has done the Oxford will recall that the previous trials had a handle on them. They’re very easy to put in. And then when you go to put in the final bearing, it seems like it’s really hard to put in, and that’s because of the long lever arm. So what we want to do is trial with a bearing that’s identical to the one we’re going to put in. And that goes in, this is a three, and remember I said this may end up being a four. This now is my little feeler, and I’m going to use this to check my tension, and this feels pretty loose. I want one or two degrees of flexion laxity and one or two degrees of extension laxity, but this is too loose. Okay. Then this also removes the trial. So here’s our four. This is what we thought we were going to use. And it should be just a little bit of flexion, little bit of pressure, and it should go in. You don’t have to break your knuckles to put this thing in. Deep flexion, no impingement. Full extension. We’ve removed any potential impingement. We go to that overhead view, you can see that very well. You can see the area where we’ve removed that bone, and that bearing sneaks right up under there so there’s no impingement, so we like that with a four.

Comments or questions?

Keith, if you get to a choice on your spacer as to being a three or a four, or a four or a five, how do you – which one do you prefer?

I’m not going to show you the five just because it’ll be tough to put in, and if it’s hard to put in it’s too tight.

Right.

I prefer to leave these looser than tighter. I mean, I know that’s a very subjective comment. And now I’m going to remove this little corner here and make sure it’s nice and smooth. I think the hard thing to appreciate when you first start doing these is that if you have a choice between a three and a four or a four and a five, say a four and a five, you want to put the four in. That’s right. We’ve removed all of our impingement so we feel comfortable, and really, that three bearing was grossly loose. The four bearing is nice and loose. It’s just perfect. I’ll remove the tibial component with this little nubbin, lift up the tibia, and then remove it. We’re going to prepare for cementation. I’ve got this little stepped drill bit. We’re going to drill a little pinwheel of holes around the femur. I like to get up under the femoral condyle with a few holes. And then in the tibia, we had a pretty sclerotic area on that tibia. We’re using a local wound infiltration capsule, or infiltration. Routinely we use Naropine, epinephrine, and depending on the patient’s renal function and sometimes age, plus or minus Toradol, ketorolac. There’s been many, many studies that show these combination would injections really add to the multimodal strategy of recovery.

Mike, while I’m doing this and we’re getting ready to cement, talk to us a little bit about – I know you do the majority of your partial knee replacements as an outpatient. Tell us a little bit about your outpatient arthroplasty program.
Right, Keith. We do about 70% of our partials at a surgery center, and about half of those go home the same day. The others stay overnight and go home the first thing the next morning. We find that these patients are generally healthy, they just have a sick knee, and for the most part are not anxious to go to the hospital and would prefer to have it done at a surgery center. So we find it safe. We find it certainly efficient. A great experience for the patient. And, quite honestly, we are able to get them a lot more therapy at our surgery center during that first initial post-operative period than we can at a hospital. The other thing that we do is we use a standard – generally you can do it either under a general anesthetic or a spinal. We commonly use a spinal anesthetic, and we use a, in addition to the block that you did to the posterior capsule, we use a continuous femoral nerve catheter block.

Now, Keith, tell me while you’re getting prepared there for cementing, what type of special techniques do you use for your cement?

I’m going to use a small little roll of that, and I’m going to impact that down into the tibia. Cement technique is critically important, you know, you don’t want to get to the end of this operation, high fiving that it’s all balanced up and then screw up the cement, so cement technique is critically important. I then will smear this cement down into the interceses (sp) and into the keel slot. I add a little bit of cement to the keel on the tibial base plate. I can look right into the back. This is a modular device without a locking mechanism, so I can see all the way around. There’s really no excuse for leaving any cement in here. Headlamp can be very helpful, particularly during the learning curve. On the femur, I like to add the suction to the top hole, so we’ll place suction on the top hole and seal off that top hole. And that negative intramedullary pressure really sucks that right in there and gives us a great wide out and a good cement mantle on our post-operative radiograph. Okay.

We’re getting a great picture there, Keith. We can see it actually sucking into the hole. It goes into the interceses and gives us great wide out on the femur. Again, femoral fixation has not been an issue for us at least, but the twin peg really adds to the comfort level of how this thing goes on. So here’s our twin peg femur, Large, just as we’ve been trialing. We want to impact this up at a 45 degree angle.

Keith, did you put cement on the back of the femoral component?

Cement on the back of the femoral component, yes. No cement on the back of the femur itself because it just gets pushed into the back of the knee. The implant is actually designed with a special cement pocket because it’s spherical, that it will compress the cement posterioral as long as it’s up against a solid cut that’s been cut correctly.

So, Mike, now here’s our four, which is what we think we’re going to be using. We want to give ourselves some longitudinal pressure, okay. Just axial pressure, longitudinal, right down the line. I’m pushing down on the knee, pushing up on the tibia. Like that. I like to then check for cement. As you can see we get some that extrudes out after that first compression. Unlike a total knee, you don’t want to jam this down into extension and push up and down on it like you do with a total knee sometimes. That is an error. And clean all the way around the side here. That looks great.

All the navigation with this is done ahead of time. We’re placing the thing where we want it in the bone. We’re placing the implants in relationship to each other. And then we’re balancing it in a standard way that’s been shown to be effective. I think this is really the next step forward. You mentioned it earlier. This is sort of the fifth generation over 35 years of improvements in the instrumentation. The implant itself is relatively unchanged.

Right, we’ve had the Phase One, Two and Three instrumentation, and then we’ve had the, most recently, introduction of the Microplasty instrumentation, and then now with this Signature, and what you’ve shown, Keith, is that the operation basically in principle is the exact same.

So the technology is being rolled out as we speak. It is mandatory that the surgeon have already been Oxford trained. And I would think, and I think the company requires, that the surgeon be familiar with the
Oxford. You also, I think, need to be familiar with some type of patient-specific cutting guide so that you can understand how to use the wizard, how to use the computer ahead of time, what changes there affect what changes in the OR. If you have experience with any of the patient-specific custom cutting guides, I think you can easily adapt to this technology. They all are very similar. I think similarities then change in terms of the latitude we have with this to go up and down sizes, to check our alignment, and just like with the Signature for the Vanguard Total Knee, we’re simply using the guides to place our guide pins to then perform the rest of the operation in a standard fashion. Very reproducible.

Well, as you mentioned, you have to be Oxford trained. And just to remind you, the next Oxford training course in the advanced Oxford instructional course is in Chicago April twenty-sixth and twenty-seventh. And those surgeons who are already Oxford trained certainly can talk to their sales reps, and there is going to be a method so you can get trained to use the Signature and become very familiar with it on a monthly basis, so the sales reps can certainly lead you into when the next one of those is available to you.

So here, Mike, we’re looking at our final trial. I like this. I’ve got one or two millimeters, two or three millimeters of play in flexion, two or three millimeters of play in extension, so I’m not too tight. I like our four bearing, we’ll go to go ahead and put one in. I’ve already checked for residual cement. The cement is fully cured. Here’s our four anatomic bearing, and it should go in with relative ease, okay. Makes a nice snapping sound. Everyone goes yay, and then you’re done. All right?

Excellent.

I do use a drain. When I do these as an outpatient, as you mentioned, I will – you can let the tourniquet down on the table now, please. I will pull the drain before they leave, otherwise the drain will get pulled post-op morning one. we looked at our first 1,000. The average length of stay was 1.4 days, meaning that 80% of people went home in less than a day. I currently do about five to ten percent of these as an outpatient that go home the same day. And I think that certainly has increased patient satisfaction with the operation.

How about anticoagulation therapy, Keith?

Well, we certainly – we use the guidelines of we use mobile compression device and aspirin in 85% of patients. They are risk stratified based on preoperative condition. Patients who are at higher risk will get some other type of an injection for a couple weeks, but we have had very good success and have been very excited about the mobile compression devices and aspirin is something that we’ve published on with all of our different procedures, but particularly with partial knee replacement it’s extremely effective. Meets all the guidelines as long as everything is documented correctly and you’re using your foot pumps or your calf pumps and you’re not placing all the patients at an increased risk of complication that you may be if you anticoagulate everyone.

What I would say is if you’re new to the Oxford partial knee or if you’re new to partial knees in general, I would do the same thing you do for total knees. Inpatient, rehab, PT, anticoagulation, drain, no drank. Army-Navy please. Whatever you do for your total knees, if you’re starting doing partials and you transition over to the Oxford Signature from the Oxford Microplasty, just continue to do the same thing that you do for your total knees. Then you’ll see the differences and you can start to adapt your program specifically for partial knee.

I would agree with you. Whatever you’re comfortable with, whatever your hospital is comfortable with, at least start there. You’ll find that this is a different operation than a total knee, and you’re going to be able to have a lot more leeway, the patients will get better quicker, and you’ll move them through the same process, it’s just going to be much quicker.

Recently we’ve completed a study with ourselves and the group from Morrisville and the group from Rush looking at total knees versus partial knees. And the risk of complication with a total knee, believe it or not, we all tend to think total knees are the end all, be all and we should just do total knees because they work
every time. The risk of complication in three large high-volume centers was 11%. If you include manipulation, IND, heart, blood clot, etc. Eleven percent versus four percent with a partial. So, it was 11% for total knees, and it's right around three percent for partials, wasn't it?

Yeah, it was a little over three percent, almost four, it was like 3.8.

And we know that many orthopedic surgeons don't do partial knees, Keith, and I know you did a lot of total knees before 2004, what – how has this changed your practice?

Oh, this has changed my practice tremendously. I mean, I do – over half my knees are partial knees now. Basically just based on the Oxford Nuffield criteria. Ignoring Cozen (sp) and Scott. There’s a great recent article out of Nuffield showing that the Cozen-Scott criteria, in their series – their first 1,000 Oxford knees with Phase Three, if you follow Cozen and Scott, only 30% of their knees fit within those criteria. And the failure rate between those that did and those that did not was no different at ten years in their first 1,000. So, those you can throw out. Understand what anteromedial osteoarthritis is. And understand how much better these patients do routinely. It's not a guarantee, it's not 100% of the time, but there is some data to suggest that one in five patients may have some level of dissatisfaction with a total knee. And there’s evidence, as Dr. Kolczun, you suggested, and we've seen, and others, that that rate is more like one in 20, or one in 25 patients that may have a problem or some dissatisfaction with a partial. So it's not 100%. I want to really emphasize that there can be complications, there could be problems with any operation. And if you really look strongly and look hard for those patients that have an attacked ACL, ligamentously normal knee, bone-on-bone arthritis medially, and a correctable deformity, you’re going to see 30% of your patients, regardless of where you are in the United States and regardless of what kind of practice you run. It's really been a huge game changer for me.

Yeah, I think it's a matter of being aware of it and looking for it. They're there, and I've heard surgeons say, well, I don't have this type of patient in my practice. I guarantee you they’re in your practice. You just have to, what we call, become a compartmentalist, not just think about the knee and use a total little knee for the simplest, as well as the most complex, knees, but you want to use total knees where they are appropriate, where it’s tri-compartmental arthritis, but certainly if it’s one compartment, and in this case the medial compartment.

I think this technology can be shown to look relatively simple in the hands of experienced Oxford surgeons, but I think it's going to be a real attribute and a real benefit to those surgeons who have done it but aren’t doing a huge number. And if that means you’re doing ten percent, you’d have to be doing, you know, 120 knees a year in order to do one a month, and so I think this is going to bridge that gap between the inexperienced or the surgeons that aren't seeing that many partial knees, and those that are. Well, thank you, very much. You've done an excellent job, as usual. We want to thank your team for staying over here at the New Albany Surgical Hospital, and all I can say is, job well done. Well, thank you, Mike. And I specifically want to thank my team for staying late and for doing a great job, as they always do here at Mt. Carmel New Albany Surgical Hospital. So until next time, thank you all for joining in, and we really appreciate your participation and interest in the Oxford and the Signature patient-specific guides.