

**DR. STEVEN**

Welcome to the Hospital for Special Surgery in New York City. I'm here, Dr. Steven Haas, Chief of the Knee

**HAAS:**

Service here with Dr. Fred Cushner of the Insall Scott Kelly Institute. And we're here to do a JOURNEY to BCS total knee replacement.

This is the OR. We've already done our time-out here. And I'd like to present first a little bit of background and presentation on the JOURNEY II knee to give you a little background. And then I'll go through the patient x-rays, and then we'll get on with surgery. Can we go on with the presentation there, please?

Well, first of all, we have to say, why do we care about doing something different? And the reality is if you look at higher level of activities, if you look at what our total knee replacement patients want to do, knee replacements are not doing as well as hip replacements. And they aren't doing as well as age-matched controls.

And a great study was done by Noble looking at this. And it showed that with many activities, those sort of light purple-colored bars compared to the blue bars. The blue bars are how many people have no pain in total knees, and the purple bars are the ones that have no pain at age-matched controls.

You can see that we just don't reach the level of what even age-matched controls are with our conventional total knee replacement. So the point is we need to do better, and then we need to do it better, especially as we're doing more active patients.

If you look at satisfaction in total knee replacements, it's not as good as total hip replacements. Many of the patients in hip replacement, more patients go back to their sports activity. In knee replacements, studies show that many of the patients don't even return to the activities that they were doing before.

It's not to say that the operation isn't good. But if you want to get patients back to higher level activities, it's been more problematic. And somewhere between 10% 20% of knee replacements are not satisfied. And so that's why I think we have room to make this better. The next slide.

One of the things that you look at in total knees-- and this is, I think, very compelling x-rays if you look at them. If you look at the x-ray on the left, that's a normal knee. A normal knee, the back of the femur lines up with the back of the tibia. That's just normal. When you look at a lateral x-ray standing knee, that's what it looks like. If you look at a total knee replacement, that's a standard total knee replacement. You could look at PS, CR.

If they're standing, that's what they look like. The femur is posteriorly subluxed on the tibia in full extension. And it's done, in a sense, on purpose like that, because that's the well point or the deepest part of the dish on the polyethylene is posterior to midline. And so what ends up happening is that's the resting position standing.

So if a knee came in and it didn't have the white showing that there was a knee replacement and it was just a normal knee without the metal in there and it was aligned like that, you'd say, boy, that knee is screwed up. And I think that's important for us to understand that we just aren't restoring the normal kinematics of the knee. Next slide, please.

And if you look at the kinematics, you'll understand why this happens. Let's look at a normal knee. A normal knee on the left, you'll see the contact point on the medial side in full extension is in the midline. And then in extension, you have a screw-home mechanism.

So laterally where all the action and motion is happening, is actually anterior in full extension. It will then move posteriorly as you bend your knee. And we'll run some video to show you, but wait when the video. I want to show-- op. In a second, I'll show you the conventional knee.

But if we look medially, you can see the medial side is moving very little except in deep flexion. The medial side's just pretty static. In deep flexion, it's going to move back. The lateral side is moving all the time. It starts in full extension all the way anterior, and then moves all the way posterior. So there's a lot of motion on the lateral side. It's a lot less constrained. The medial side, more constrained, motion only in deep flexion. OK, let's go to the next video.

If we look at that slide again, we look at the conventional knee replacement. What you're going to see is the starting point is posterior to midline. That's where the knee sits in full extension. And that's why it looks posteriorly subluxed.

And as soon as you bend the knee-- run the video, please. As you bend the knee, you're going to see it slides forward. So what happens in the knee, it slides forward. And if it's a CR knee, it may continue to slide forward until the PCL takes tension up.

And a PS knee, I think they function better, but they still slide forward until the cam-post engages, which is 70 or 80 degrees. And then there's rollback. And there isn't a lot of rotation, because all the rotation is eliminated as it goes into deep flexion.

So while it's done that way to try to get good flexion-- and that generally can work-- it does it in a very aberrant way. And then we wonder why our knees feel instability, why they're feeling that it's not like a normal knee. And that's one of the reasons why. Can we move on to the next slide?

What I'm going to show here is the x-rays you saw already on the left. There is a normal knee, there is a conventional total knee replacement. And then the two next two are a CR and a BCS JOURNEY II knees. And if you look at them, you'll notice that the positioning looks normal, because it's resting position. And when you're standing is lined up with the natural knee.

And you can imagine, if your AP position is abnormal, your collateral ligaments are abnormal. So this is why that's very important. This restores stability to the knee, eliminates that anterior sliding. I think if you want to restore natural kinematics, that's what you need to do. Let's run the videos now.

So again, the normal you've already seen. We'll run this very quick, just run through once or twice there again. All the motion lateral side. So now we can move on to the video of the JOURNEY BCS. So now again, the resting position. Resting position is much more in the medial side. It's in the midline. It's a little anterior to the midline in extension.

And watch it move. And you'll see that the medial side is not moving that much, but the lateral side is moving a lot. All the motion is happening, except in deep flexion, all the motion's happening on the lateral side. And then deep flexion, you'll see some rollback on the medial side. But basically, the motion is happening on the lateral side. OK? We can move forward. Because we want to get on to the surgery.

How that's accomplished, really, it's a simple concept. If you restore the natural shapes, the thing will move normally. Total knees are totally abnormal in their shape. Because the natural knee-- and all you have to look at your bone cuts. And I'll save my bone cuts here. And you'll see that the bone cuts themselves are not symmetric. It's thicker on the medial side, thinner on the lateral side. Anteriorly, it's thinner on the medial side, thicker on the lateral side.

Just look at the bone cuts you do on a total knee and you see they're not symmetric. The way a JOURNEY was designed is simple. They took CT scans of what normal knees are. And then they made the bone cuts of a total knee and then glued the parts back together in a computer. That's the shape of the knee.

Additionally, the plateaus aren't different. You know this from an MRI scan. The medial was very concave, the lateral was convex or less-- it's not concave like the medial side. And that's essentially what his JOURNEY looks like. The polyethylenes are asymmetric. They are very dished, are curved like the normal medial plateau. The lateral side is not. It's much more flat, so it allows much more motion on the lateral side. OK. Next slide.

Also, some other aspects of JOURNEY that I think are important to mention is that, essentially, there is also an anterior cam so that if the knee is sliding forward, it will engage. Now, almost all PS's will do this. But when they do that, they have the front of the post hitting a non-articulated rough edge of a box. So that's a bad thing to happen.

Here, it's a good thing to happen. If it happens, it's built as a low-contact stress articulation so that it will provide stability. There's also stability in deep flexion on the medial side because of a very dish lip on the posterior side of the knee. Again, to try to stimulate the normal pattern of motion. And essentially, because the cam and post are rounded, they allow for rotational motion without increasing stress in the post-cam. Next slide.

And one of the reasons we went to JOURNEY II from JOURNEY I, we saw a lot of these kinematic improvements in JOURNEY I. We've continued them on in JOURNEY II. What the JOURNEY II adds, and I think very important, is essentially a full line. You want to be able to do this on all knees. So there's a CR that's available, there's a [INAUDIBLE], a BCS. So it essentially adds stability.

And additionally, in the bad knee, when you have a knee that had bad valgus or a knee that has not competent collateral ligaments, there is a constrained option as well. Additionally, there's a revision tibial baseplate, so you can add stems or augments as you need to do.

So having done that, I want to move on to our surgery. So I'm going to go back and bring you back, and we're going to look at some x-rays. And then we're going to go on to do some surgery. So I'm walking over. You can see me, I'm looking at some x-rays.

Essentially, what we have here, it's a straightforward varus knee. We can see I draw the cuts. I think it's very important to know what your bone cuts are going to look like before you make the cut. You can see our lateral cut should be a little bit more off the lateral side than the medial side. A perpendicular cut on the tibia. The technique is just like your standard technique. I always get a PA flexion view.

Here it looks very similar. Some knees, I think it's important, because you will pick up the joint space narrowing more on the PA flexion view, the Rosenberg view it's sometimes referred to. Over here, you can see the patella. The patella is tracking laterally. This patient has a fair amount of lateral arthritis in the patella. The lateral facet is fairly worn, and there's subluxation of the patella. So we're going to see how that looks when we go on.

And the last thing I'd like to do is show that I can pull up a template-- that I templated the knee with our PACS system. And I think this is a nice picture to look at, because what it shows you is the shape of the knee looks just like the shape of the natural knee. Essentially, we template this. And I think this is very important.

If you want to get high flexion in the knee, you really have to have the natural posterior contour of the knee. If you see a knee and your posterior condyles are not the same curvature of the natural knee, that's a knee that's not going to bend a lot.

So this allows for high flexion by two things. One is following the natural curvature. But also, it's maybe difficult for you to detect, but the posterior condyles are actually cut at a 15-degree angle, sloping upward. And that accomplishes that you can have coverage all the way back on the posterior condyles by only removing a small amount of bone.

This isn't a thick posterior condyle. This is a condyle that's nine millimeters on the medial side, seven on the lateral side. So even with a seven millimeter posterior condyle, you can resurface all the way onto the back edge of the knee.

So having said all that, I'm off to do some surgery here. So now let's go on to our patient, OK? Let me see. What? OK. All right. Do we have our picture of our knee? Are we ready to go?

**SPEAKER 1:** Yeah.

**DR. STEVEN HAAS:** OK. Excellent. Our tourniquet's already up. We've drawn the incision. I do a mini-midvastus approach. Here's the top of the patella, so I'm at the top of the patella. Here's the tibial tubercle. I go along the medial board of the patella. Would you give me a knife? OK.

**DR. FRED CUSHNER:** So you go just to the level of the top of the patella, Steve?

**DR. STEVEN HAAS:** I go to the level of the top of the patella. In males, it's usually about a finger above the patella. She's a woman who we might go a little bit above partly so you can see everything. But that's about as much as we'll need. I probably have even a little bit more than I probably will need-- forceps-- on this patient. This is going to be about nine centimeters.

Someone like this, a medium-sized female patient, usually you can go at about-- you know, use whatever you need to do. But for me, it's usually about seven to eight centimeters. This is probably about nine. I think so we can see a little. See, you can see very well.

**DR. FRED CUSHNER:** Now, in choosing the JOURNEY knee, was this based on the patient's age or activity level or just because we have a live surgery today?

**DR. STEVEN HAAS:** [LAUGHS] Yeah, good question. Now, you know, you could use it in everybody. And I think the people who benefit the most are going to be the people who are more active. But really, the whole idea is that you can use it in everybody. So you can see I've gone medial to the patella. I'm going to go up. There's the VMO, so we're going to go up, and just run right into the VMO. And there we go. That should be good. OK.

[INAUDIBLE]. So then I'll take a [INAUDIBLE]. I'm going to want to just-- and knife, please. So I put the [INAUDIBLE] to hold the patella out of the way. And then I'm going to take the fat pad out.

Ashley, my assistant-- I should mention Ashley and David and Jeff for the assistance here. It's my regular team doing a great job. So what I do is I free that up and take out some of the fat pad. Then I'm going to make a window in the anterior cortex, because you want to be able to reference.

**DR. FRED** So you introduced everybody, but you left out the famous Nigel Sharrock, huh?

**CUSHNER:**

**DR. STEVEN** Oh, my gosh. We have Nigel Sharrock is my favorite anesthesiologist in the world from New Zealand. He came to  
**HAAS:** HSS the same day I came to HSS. He came as chief of the department, and I came as a resident. But he still will talk to me. OK.

**DR. FRED** Now, is there any knee you wouldn't do a JOURNEY to?

**CUSHNER:**

**DR. STEVEN** So I'm going on the medial side of the tibia here. I just take the bovie. Then I take a box elevator. And then I'm  
**HAAS:** going to free up the deep MCL right at the top. Don't need to do a big release. I don't like to make a big release there.

Now, my next step is to cut the patella. I think it's very good to cut that patella, because it gets it out of the way. You can see I can flip it 90 degrees. And so essentially, I can face it. You can see the disease. She's got bare bone on her patella. All right. So I flip it 90 degrees. I can then see nicely at the patella.

[SAW BUZZING]

**DR. STEVEN** I'm going to make at least a preliminary cut. I can take a little bit more later on. But at least I get the crest out of  
**HAAS:** the way. And that helps with the exposure of it.

**DR. FRED** And did you just use any anatomic landmarks? Or you just--

**CUSHNER:**

**DR. STEVEN** What I try to do is get under the articular surface of both sides. That's ultimately what I want to do. So I'm just  
**HAAS:** under the articular surface on the medial and lateral sides of the patella. So great. So can you lower the table just a little bit, Nigel? A little lower, just a touch lower. Yeah. Lower.

And I've got a little fascia right here which we'll cut. That's just the fascia on the muscle. And boom. We have great exposure here. We won't need any more, for sure. David. Yeah, that's great. OK.

I mark a line. Let me just show that again. I used the AP axis or Whiteside's line as my main reference point. Now, I'm going to look at the posterior condyles, too. It's easy to find that. It's easy to see. I find the epicondyles hard to see. But you know, Whiteside's line is right there. OK? So we just go in.

You want to place the starting hole anterior to the PCL, OK? Because you can alter your varus-valgus if this is not in the right position. And I let the drill pull itself right up. That way I'm not pushing it through. Let it just pull itself right into the femur. That way you're never going to perforate or put it in somewhere you shouldn't put it. I put the guide down. It's simple. I pushed the rod up as far as it will go. Ashley pulls a little bit, and then we're going to do a-- just tap that down.

Laterally, be careful. Don't whack it, or you could end up causing more valgus in the knee than is necessary. Because it's often not touching the lateral side. As a matter of fact, it usually is not, because you're taking a femur that is more valgus than the cut you're making. Swap with me, Ashley, please. Thank you.

**DR. FRED CUSHNER:** So it's interesting, Steve. On those pre-operative x-rays, I'm sure there's some people in the audience that would say, why aren't you doing a f But you can see you're absolutely right. There is significant patellofemoral arthritis there.

**DR. STEVEN HAAS:** Oh yeah. I think if somebody does a uni here, and I'm not anti-uni, but this is a situation where she's got pretty advanced patellofemoral disease. You could see bone on bone. And it's lateral facet too. Even the uni likers wouldn't say that's not what they need to do.

[SAW BUZZING]

**DR. STEVEN HAAS:** There we go. OK. Now, we'll save the bone cut so we can look at it. Now, just to show you, if you look at the bone cuts-- where's my camera here? You'll see that they're thicker on the medial side.

This camera, you got it? Thicker on the medial side than on the lateral side. So this should be about nine and a half millimeters. And the lateral side would be seven millimeters. And you'll see that's the same thickness of the implant. The implant's going to look like these bone cuts. So I'm putting the bone cuts here.

And now we'll go down and do our tibia. All right. We'll want to take off the osteophytes on the medial side. If you almost think about-- knee placement in general is a resurfacing operation. You should think about it as a resurfacing operation. I'm going to cut my ACL, whatever's left of it. Cut the anterior horn of the lateral meniscus. That'll help to get our tibial bone out later.

**DR. FRED CUSHNER:** Steve, you pay much attention to how the bone looks? You know, the old butterfly appearance to confirm that you're at the right resection?

**DR. STEVEN HAAS:** You know, it's interesting. I think you want to be down to the trochlear level. So to that extent, I do. I don't actually look for the butterfly. Although, I'm looking when I cut that it's on the trochlea. So sort of implicitly, I'm doing the same thing. But I'm actually looking at it a little bit differently. I look at, when my saw is there, that it's at least touching, that we're not airballing the two condyles with nothing in between.

Now, David is just-- I put a guide in there. Just let me show them a little bit of how we do this. We set our guide. I usually set it at about 10 millimeters, if I'm doing a varus knee, off the lateral side. So we're going to seat that on there. And what I do is I think it's a good idea to separate those activities. Don't try to do everything at once. I measure the depth, mark it. And then we're going to cut. So let me position now. OK. All right. We like that.

So what I've done is I marked the depth first. But I didn't try to do everything together. And at the ankle, it's usually at about six millimeters medial from the zero. It's at the six-millimeter mark. If you can look down at the ankle, it ends up being that I'm putting this at the second ray. You want that at the second ray. That'll help you get-- and I'm lining this over the crest.

But I must say, people have their own methods of doing tibial cuts. I think that it's really whatever you're comfortable with. That's what I like to use, the crest. Some people like to use [INAUDIBLE]. Some people like to use the tubercle. I think you can use whatever you feel comfortable with.

But the idea here is that you should line this up with the ankle, I think, at the second ray. And the slope is essentially you just make this parallel to the tibia. The three-degree slope is built right into the cutting block. So you just want to have the stock parallel to the tibia. So straightforward.

[SAW BUZZING]

**DR. STEVEN HAAS:** When I do this cut, I'm going to leave a little bone posterolaterally, anterior laterally for the vessels, for the tendon. And also some medially, because I don't want to injure the MCLs. So I don't mind leaving little bone bridges and not going through the cortex. Oh, here. All right. Off we go.

**DR. FRED CUSHNER:** Now Steve, you're using conventional instruments. Do you ever use PSI for the JOURNEY II?

**DR. STEVEN HAAS:** Oh yeah, I do. I frequently use PSI for both the LEGION and the JOURNEYS. And it's actually very, very useful to do. I think that sort of the part about it is that you have the pre-op plan, which actually is very helpful to know what you're doing. In this case, it's a pretty straightforward one. So I think you could do it either way.

**DR. FRED CUSHNER:** Sure.

**DR. STEVEN HAAS:** Now, that's actually interesting. We had a case earlier today which we did as a PSI. Now notice what I've done. I've subluxed that forward. So now I'm protecting my MCL large weight. So I can cut this little bit of bone that I left in place so I would make sure that I didn't bugger my MCL.

[SAW BUZZING]

**DR. STEVEN HAAS:** So now I'm safe to do that. But anyway, we did a VISIONAIRE. It was a case that was great for VISIONAIRE. It was so unbelievable. This case was a post-traumatic, had a complex fracture of the tibia, an old history of a fracture of the femur.

And we didn't want to invade the intramedullary canal. And we also had a lot of deformity of the tibia and femur. And so this way, I thought the case was going to be hard. We were done in 40 minutes. It was so incredible, because everything just worked. So I think the VISIONAIRE is great. I think this is good, in some ways, to teach you, because if you do the VISIONAIRE where you just do it, and it's all the pre-planning. And so I thought this would be a nice thing for teaching, because we can go through a little bit more education of why we're doing it.

**DR. FRED CUSHNER:** Sure.

**DR. STEVEN HAAS:** All right. So I like to take my lateral meniscus out now. A lot of people don't do it that way. But the reason-- through a small exposure, you can essentially retract the patella, because there's no tension on the extension mechanism. So I've now taken my lateral meniscus out. Actually, we can just go check our gaps here.

**DR. FRED CUSHNER:** Sorry.

**DR. STEVEN HAAS:** Give me my extension. I'll take my extension gap.

**DR. FRED** Steve, we have a question from the audience.

**CUSHNER:**

**DR. STEVEN** Yes.

**HAAS:**

**DR. FRED** When you do your bone cuts, do you change anything between the JOURNEY and the GEN II and the LEGION?

**CUSHNER:**

**DR. STEVEN** I actually don't change anything. I do the same thing.

**HAAS:**

**DR. FRED** You don't ever take the 12 millimeters off the lateral side because of the little thicker with--

**CUSHNER:**

**DR. STEVEN** No, I think I have a lower threshold for taking a plus-2 cut in a LEGION. And if anything, I take a millimeter, maybe more, on the tibia. But basically, I'm doing the same thing.

**HAAS:**

**DR. FRED** Sure.

**CUSHNER:**

**DR. STEVEN** Now this looks good. I need a little medial releasing. I can see I'm a little tighter on the medial side than lateral side, which isn't surprising. I think I have to take off, do a little release of the [INAUDIBLE]. Here. Let's take this and use the nine in flexion.

**HAAS:**

One of the neat parts about JOURNEY is that you have these flexion blocks. So I have not cut my posterior condyles. I have not cut the posterior condyles, but I have a block. Can you see that? All right. I have a block that essentially-- I'll look at it this way-- that I can place in. And that will be placed under the condyles, so that I can check my balance before I make my cuts.

The problem when you check the blocks, you've already bought your rotation. You've already bought your flexion gaps. This way, I have the potential to make a change to my rotation, which I'll show you. So you just place it in there. OK, bend up the knee. And there you go. All right?

So now I can look at my balance here like that. All right. Let's get some retractors in here. I'm going to release the PCL, because that will also affect that. All right. Give me that bovie. I'm going to release the PCL. And then we're going to rock this around and see how it feels relative to my [INAUDIBLE].

As a good example, if I check the balance in flexion, I find if it's loose or if it's tight, I can adjust my flexion gap before I make the cuts. If I find-- for instance, the most common thing you'll see, because the posterolateral side of the knee is loose, especially after release the PCL, that you'll see gaps laterally.

In this case, it's not. It looks pretty good. Maybe a millimeter here. And about the same, maybe a little tighter on the medial side. But not very different. So in that case, I'm just going to not add additional rotation to the knee.

If you add rotation to the knee, you're going to tighten your posterolateral side. So I could do that. If I found it was laxity, I could adjust the gaps as far as tightening them if I needed to, or loosening them. And I'll show you how we would do that. OK. So now have our sizer. And I need a [INAUDIBLE] for David.



**DR. FRED** And what size did you template? We're going to see how accurate you are.

**CUSHNER:**

**DR. STEVEN** We are going to see. I think it's Ashley who templates usually. And she's pretty good.

**HAAS:**

**DR. FRED** Ashley, for the record, what did you template?

**CUSHNER:**

**DR. STEVEN** She said it was a four.

**HAAS:**

**DR. FRED** She said a four? All Right.

**CUSHNER:**

**DR. STEVEN** All right. Why don't you take this off and knock it all the way down.

**HAAS:**

**DR. FRED** We'll see if Ashley's as good as you say she is.

**CUSHNER:**

**DR. STEVEN** Knock it all the way down. OK. So this block is-- most guides are not going to get into the whole rotation, why most guides do it incorrectly. But the issue is that this guide is-- once you've set this-- oh, boy. I think-- let's see.

**HAAS:**

Now remember, the sizing are very close together. The difference in sizes are really-- there's only three millimeters. So you can actually have-- sometimes I think. Well, it's going to be-- let's see. It's really sizing. See what I've gone on it. It looks like a three. It is a three. We are a three. You can go to four.

Remember, it depends where you go. But I think if you go to a four, you're going to be up on the lateral side. That's way up high. I don't like to go way up on the lateral ridge. I don't like them to be stuffed in the front. So I think that. All right. Let's go for it. Will you give me this? All you have to do-- oh, wait, I am going to rotate some more. Let's see. Wait. Maybe.

**DR. FRED** So you can dial that into the anatomy. Whiteside's line at the [INAUDIBLE] axis?

**CUSHNER:**

**DR. STEVEN** You got me not paying attention to my rotation first. So I've got to rotate first before I set my size. Because that might change your size, too. So let me get my rotation. Now, here, let me show you here. This is the whole operation, I think. Now, give me a cushion. I want to show how we're doing this.

**HAAS:**

This is set at zero. OK? That means that we're taking the thickness of the implants off the posterolateral side of the knee. OK? And we have it set at zero. And then we're sitting the-- this is the rotation axis from the posterior condyles to the AP axis. So I'm lined up. This is lined up or parallel to the AP axis.

Now, note this is often not three degrees. In this case, it's a little over four degrees to get it lined up. So that's the correct lineup. So let me look at the-- let me look. Sometimes, again, they're so tightly sized that when you do this, you actually might be-- so now I'm going to look at the-- I think a four might be the right size here. Yeah, four is definitely where we want to go.

**DR. FRED** So Ashley was right?

**CUSHNER:**

**DR. STEVEN** Yeah.

**HAAS:**

**DR. FRED** OK.

**CUSHNER:**

**DR. STEVEN** Because here, I hadn't done my rotation first. But if you rotate that-- can you see that in there?

**HAAS:**

**DR. FRED** Yes.

**CUSHNER:**

**DR. STEVEN** I don't know how well you can see that.

**HAAS:**

**DR. FRED** Oh, we can see it perfectly.

**CUSHNER:**

**DR. STEVEN** It's right on the four. If I'm in between sizes, OK, I would even take and tighten the flexion gap by 1 millimeter. I won't go more than that. But I don't mind. A PS knee, I think it's OK to tighten the flexion gap. So now give me-- so you can take this and you can even-- I think it's OK to-- rather than-- I don't like to stuff the front.

**HAAS:**

I would rather tighten the flexion gap, because you tend to loosen the flexion gap as you do this. So there you go. Simple as that. OK. So all you do now is make these holes. That's it. We're done.

**DR. FRED** Steve, we've got a couple questions from the audience if I can jump in.

**CUSHNER:**

**DR. STEVEN** Sure. Because I think that's an important part of the case right there.

**HAAS:**

**DR. FRED** When testing the extension gap, what do you do if there's large posterior osteophytes? Does that ever throw you off?

**CUSHNER:**

**DR. STEVEN** Yeah, the answer is that you're really not checking that most terminal extension that you would know. I don't think that the posterior osteophytes matter a whole lot with the blocks in. In theory, if they're big enough, they could.

**HAAS:**

But most oftentimes, you know, even if it's at a couple degrees of flexion, you're checking more, I think, the collateral ligaments when you're doing it with a block. With the real implants, there's no doubt it can affect, because it's essentially rolling around, going into full extension. I think with those blocks, you can be a little bit flexed and you wouldn't know. Let's take a look here. I could usually do this with-- well, let's see if I can get one pin in.

**DR. FRED** And the rotation that you just showed on that guide is certainly different than the LEGION, correct?

**CUSHNER:**

**DR. STEVEN HAAS:** Yes, it is different than LEGION in the sense that LEGION-- I think that this pin's not going to hold as good. So give us some headed pins. Because I think it's going into the hole of the drill hole.

It is different than LEGION in that the LEGION, if you want more rotation, essentially, what you have to do is-- yeah, let's do this one here. If you want more rotation in the LEGION, and oftentimes, you're in a valgus knee, for instance, you should put an augment on the lateral side. So it's a little bit different. I think this is a little bit better-- actually, a lot better. I happen to like it more. It's simpler.

[SAW BUZZING]

**DR. STEVEN HAAS:** OK.

[SAW BUZZING]

**DR. STEVEN HAAS:** There was an extra chamfer cut on the JOURNEY knee. So notice I did my anterior cut. Now I'm doing an extra chamfer cut. OK?

**DR. FRED CUSHNER:** Is that the cut that said number two?

**DR. STEVEN HAAS:** That's cut number two here. Then I'm going to go to the back condyles. And remember, it's at 15 degrees, but you don't really notice it, because if the legs a little more, it stays the same. I always have this retractor under the MCL. Very important to do. You don't want to bang your MCL.

[SAW BUZZING]

**DR. STEVEN HAAS:** All right. And Ashley's going to pull this a little bit out of the way there.

[SAW BUZZING]

**DR. STEVEN HAAS:** Good. Now I'll do my chamfers.

[SAW BUZZING]

**DR. STEVEN HAAS:** Notice, for those who do LEGION-- let's take that pin out of here, because this is going to get in our way. For those who do, you either got to knock this all the way down or take it out. And I like to take it out. Here. Here, let me do that. Tap it down a little bit. Just make sure it's down.

[SAW BUZZING]

**DR. STEVEN HAAS:** OK.

**DR. FRED CUSHNER:** Now Steve, I saw you cut your anterior cut medially. Was that to avoid notching?

**DR. STEVEN** Did I cut my anterior cut-- Yes. Yes, I start the cut medially, so that you can see that it's going to come out.

**HAAS:** Because you have more room medially before-- the lateral side's the higher side, so it's more likely to not. So that's a very good point, Fred.

**DR. FRED** So if you took a stylus or an angel wing and you thought you were close, what's that thing in the front?

**CUSHNER:**

**DR. STEVEN** Yeah, let me show you what I would do. Can you pull those pin out of here? We've got to tap our pins out of here.

**HAAS:** Or give me any. Any block will do. OK? Well, give me another block.

Let me just show you the block. And I want to just show something to you. This is a different size, but it doesn't make a difference. The blocks have some capabilities that other blocks don't have. Could I have a screwdriver? OK.

If you want to take this block-- if I was worried about notching, OK, I would take this block and I would dial it. And I would dial this. And what it does is it shifts the block anterior or posterior. So if I roll it counterclockwise, it'll shift the block anteriorly. So I'm taking a little bit more posterior bone. And it'll say, one millimeter posterior or two millimeters posterior, which means taking one millimeter more posterior bone or two millimeters more posterior bone.

Similarly, if you want to do it the other way, you can dial it one or two millimeters more of anterior bone. So if you were worried you were going to notch, and you put this block down, and you say, god, I think I'm going to notch, I would dial it up, lock it in place, cut.

And actually, I would look and see if I was notching. If I had room in the front, I'd dial it back down. But I can cut and look before I commit myself. So it's a nice feature that you really can't do with most implants. But you can shift this block, which gives you some versatility.

Can I have the puller off? I'm going to take it off, so give me the-- Yeah, I'll take the block off. And to take it off, it's easy enough. You just put this on and pull it off. OK. Half-inch curve.

So now if we look at this bone cuts again, OK, I'm going to put this next to my distal cuts, OK? So this, again, medially, is going to be thicker than it is laterally. Did you take out my lateral bone? Oh, my lateral bone fell, so I can't look at this. Oh my god, the lateral bone fell, so I can't show it to you. Well, I guarantee you it's thinner. You'll have to take my word for it. OK.

So I think we're now in good shape. So give me a laminar spreader. Now, an interesting thing is the laminar spreader-- now you're used to having that leg positioned at 90 degrees.

It actually is going to be 105 degrees, not that you paid attention it was 90 degrees. But it's actually going to be a little bit more, because the parallel surfaces for the posterior cut and your tibial cut is a little bit higher, because you have a flexed condyle.

**DR. FRED** Steve, now, those posts to your cuts are angled. Do you think that helps get a better fit? Because there was  
**CUSHNER:** some concern about some of the high-flex designs with the early loosening with the flex. Do you think you could--

**DR. STEVEN HAAS:** Well, there was the article from Korea that showed this. I think that just as you get high-flexion knees and you-- the way you get high flexion or resurface posterior part of the condyles is just by making the thick condyle. I think it does two bad things. One is by taking-- you just make a big condyle, so you lose a lot of bone.

So if it's 11 or 13 millimeters, which some of them-- some of those high-flexion implants were literally 13 millimeters. You know, you are taking a huge amount of bone. So give me an osteotome. And the nice part here is also you remove most of the osteophytes just by making that slope cut. I always check for anything, because I don't like any osteophytes in the back. But there's not much here under.

But the other thing is that think about it when it's on high flexion. If someone, you know, is in very high flexion-- especially in Asia, and I think that's why they saw the problem-- the forces are literally pushing the implant off the bone. They're literally pushing it off.

Whereas here, since the forces never become perpendicular to the cut, or parallel to the cut, I guess. It's parallel to the cut's surface. So that it's pushing the implant off. It's always more oblique, which I think makes a lot more sense. I think we have nothing back here. So we're nice and clean back here.

**DR. FRED CUSHNER:** Yeah, we had a question, Steve. The reason he put the size five block on was because I asked him a question. Somebody thought that you put the wrong size.

**DR. STEVEN HAAS:** No, I didn't-- I put that on, because there was a pin that I couldn't get out of the other one, so I just put it on.

**DR. FRED CUSHNER:** Right, it was for demonstration purposes.

**DR. STEVEN HAAS:** It was just for demonstration purposes.

**DR. FRED CUSHNER:** It was purely to show--

**DR. STEVEN HAAS:** That was not an accident.

**DR. FRED CUSHNER:** The feature of that guide. He did not--

**DR. STEVEN HAAS:** I got enough. Give me a nine. I want a nine.

**DR. FRED CUSHNER:** Nope.

**DR. STEVEN HAAS:** I got enough accidents I do for real life. That was on purpose I did. There. It started? I like to start this in extension. There we go. So we're in. And we've got nice balance here. Again, I want to go take the [INAUDIBLE] of this. It's the only thing I really think I need to do. It's not bad, but I think I should get rid of the [INAUDIBLE]

And I'll bring it up into flexion. And that looks great. Can you see in this? No gapping. You don't want gapping. I think flexion gaps ought-- in a PS knee, your flexion gap ought to be snug. You don't want gapping. Or at most, a millimeter or so if you can help it.

And notice the lateral side isn't gapping. A lot of knees, you'll see a lot of lateral gap in the knee. Give me a [INAUDIBLE], so Ashley has it there. We're even stressing this in valgus. No open at all. And again, that's a matter because your rotation's correct.

So I think that rotation sizing is the most important thing. It couldn't be simpler. If you line it up, you line up with the AP axis, you set your rotation-- I never go less than three unless in rare circumstances. And it's whatever it lines up the AP axis. It's usually three, four, five degrees. In valgus knees, it's six or sometimes even more. OK. That looks great.

**DR. FRED CUSHNER:** Now Steve, we have a question. It was very interesting, because we talked about this with young, active patients.

**DR. STEVEN HAAS:** I want to release this. All right. I'll do the patella.

**DR. FRED CUSHNER:** Because this knee is more kinematically appropriate and accurate, would you allow somebody to jog with a knee like this?

**DR. STEVEN HAAS:** The answer is I still don't let people jog. Well, I should-- [LAUGHS] A better way to say it is I still don't tell them they can jog.

**DR. FRED CUSHNER:** Right.

**DR. STEVEN HAAS:** There's no doubt I have jogging patients. I once had a patient who showed up on the news with a reporter, jogging. I had no idea they were doing it. But she was actually an Olympic-level jogger. She was somebody who had gone into the-- it was in the Olympic trials. It was a woman who weighed about 105 pounds. So she might be getting away with it.

The reason I don't let them jog is that, literally, you generate high loads in the knee literally five times or more body weight. Even when you're just doing stairs or when you're playing golf. But the difference is in jogging, you generate those loads so many times with such frequency that by the end of the hallway, you've generated it 30 times by the time you got to the end of the hallway.

So I'm worried about not short-distance jogging, not even, like, tennis running, but longer distance jogging. It's not a matter of the kinematics. It may feel all right. But I worry. They're usually young patients in their 50s or even late 40s. And I want a 32, please.

**DR. FRED CUSHNER:** For me, the difference is jogging you can do three or four times a week. Most people aren't playing basketball or tennis three or four times a week.

**DR. STEVEN HAAS:** Right. They're not at these high, competitive levels. I agree. 32 is what we want.

**DR. FRED** But this knee does come in OXINIUM cross-linked poly, great wear data, which is a subject for another day. But  
**CUSHNER:** certainly, it has a lot of features that should tolerate more of the impact activity.

**DR. STEVEN** OK. Good. That looks great. All right. I always take down the patellofemoral, the synovial folds, the patellofemoral  
**HAAS:** ligaments.

**DR. FRED** When you size a patella, you go for the biggest size that will fit?  
**CUSHNER:**

**DR. STEVEN** I try to maximize-- yeah, I just want to get a bleeder in here. I try to maximize their-- we got a bleeder? There we  
**HAAS:** go. I try to maximize their

**DR. FRED** Coverage?  
**CUSHNER:**

**DR. STEVEN** Coverage. There was a study, it was a very nice study. I think it was in about 2010 at the Knee Society that  
**HAAS:** looked at crepitus of the patellofemoral joint. And they found that if you had larger patellas, you tended to have less crepitus. And I think that makes sense if you think of all the scarring that occurs. If you have a bleeding, bony surface around the patella, it's going to stimulate more scar. If you can get coverage, you're going to be better off. OK?

So what I do is I just sublux the tibia. Like, this is the time I'm going to sublux the tibia. Let's have another [INAUDIBLE]. Oh, did we check our alignment? You know what I want to do? All right.

We'll do it with the block and rod here. And we'll do it here with this. Give me the [INAUDIBLE]. OK. Here we go. Give me my three. We'll do it with the baseplate. OK. It's going to be a three tibia. Maybe a two. Let's see the saw. Let's size up our tibia. Give me a saw, please.

[SAW BUZZING]

**DR. STEVEN** Little bit of bone back in there. So remember I told you I always leave a little bridge of bone in the back. So we  
**HAAS:** didn't go through our back cortex, so I'm taking that out now. OK. Good. Give me, let's see, a two. It may be a two or a three. I'm not sure. Let's look at it. Oh, I think this is two. OK. If you look at this, let's go here.

**DR. FRED** So you have a size four femur. Any rules about--  
**CUSHNER:**

**DR. STEVEN** Yeah, there are rules. You can go two sizes away. And actually, if you want, we can pull the table up on my-- we  
**HAAS:** can pull up-- Evelyn, you want to pull up the chart on OrthoSecure, Evelyn, pull up the chart.

**DR. FRED** So what is it? One up, two down with a high flex? Is that the--  
**CUSHNER:**

**DR. STEVEN** Evelyn, push the chart. OK. Now, I set the rotation. Actually, this is a good point. If you look at rotation, OK,  
**HAAS:** rotation in these knees essentially is going to be if you line up these anatomically-shaped tibias, OK, what you'll find is that the-- can I see that-- that the medial anterior tibia lines up. And then the posterolateral lines up at the cortex, OK?

So if you do those two-- now, if you could pan over there, by the way, if you want to look at the camera, we have a program that checks our implant compatibility. And one of the things, it has the implant chart up there. So can you show the chart? You can essentially go essentially two sizes away. And there it is. And you're looking. We have a one, two. And it can go with a four. Can you show that?

**DR. FRED** Yup.

**CUSHNER:**

**DR. STEVEN** Oh yeah. So I'm going to release that [INAUDIBLE] now. There we go.

**HAAS:**

**DR. FRED** And that's a computer program that you guys have, Steve?

**CUSHNER:**

**DR. STEVEN** Yeah, it's a program that's called OrthoSecure that we-- essentially, it checks our implant compatibility. And we'll show the labels of the implants so that we can see it much better, avoid errors in the operating room. It makes it quicker for us, too.

**HAAS:**

**DR. FRED** So that's just for JOURNEY? Or Smith & Nephew?

**CUSHNER:**

**DR. STEVEN** No, we do it for all the cases here at the hospital.

**HAAS:**

**DR. FRED** Oh, OK. All right.

**CUSHNER:**

**DR. STEVEN** OK. So here, important points. Couple other important-- I use this block. You don't have to use this. This is an extra block I use. Small blade. It's the idea that I hate when you're doing knees and you're not seated on the medial or lateral distal plateau.

**HAAS:**

[SAW BUZZING]

**DR. STEVEN** In other words-- now let me go up front. Here, let's go look at the front. Sometimes I also don't finish the cut.

**HAAS:** We'll see where we are here. I take this PCL retractor, go up top. Oh, we're right on the cortex there. That's great.

[SAW BUZZING]

**DR. STEVEN** So just to show you here-- I don't know if you can see up here. I'm literally right on that cortex. Can you all see that?

**HAAS:**

**DR. FRED** Mm hm.

**CUSHNER:**

**DR. STEVEN** Here's the cortex. It looks perfect. See the lateral cortex here?

**HAAS:**

**DR. FRED** Yup.

**CUSHNER:**



**DR. STEVEN**

Can you get in there and see? So our size is just right. Gaps are balanced, and we're sitting right on the anterior cortex. So that looks terrific. I like to finish that cut manually, because that way, we'll never notch. I can just finish the cut up. I leave a little bridge of bone.

**HAAS:**

Now, when you're doing JOURNEY, you're putting on the implants a little bit differently than you-- go a little bit deeper, Dave. A little bit deeper in here like that. There. One of the things I like to do is to use this PCL retractor. Actually, Mike Ries told me this. It's a great technique. As opposed to you reaching up under the thigh and holding the leg-- and I do this on all my cases. This way, you can lift the femur-- especially in the heavy bone, you can lift it up and not have to grab under a thigh that you can't really get a hold of.

Now, when you're placing the implant, remember it has the 15 degree slope cuts. So you're like, oh, well, how can I get that on the bone? Because it doesn't go on straight. You can't just put it on straight. But it's actually quite easy to put it on. What you do is you put on a little bit of flexion, OK? You bang it down. And then you bring it up into extension, and then actually hit it in extension. And that's it.

And the neat part about this, OK, this bone is all the way down, all right? I'm going to grab this. Look at how it locks onto the bone. I can pull it, it won't come off. This is that whole issue of how it's better than if you're pushing it off. This thing locks onto the bone once it's on. You have to flex it to take it off. So there around.

Both LEGION and JOURNEYS have this, which I think is the most win-win in instruments that have ever been developed, which is you prepare that right through the femur. It saves time. So I've set this up like a CR. It's a trial that, essentially, I am placing on the bone. And instead of an extra bar, I know my ML position exactly. I'm happy with that. We pin it in place. And then to prepare the box--

**DR. FRED**

So it's exactly where you want it?

**CUSHNER:**

**DR. STEVEN**

It's exactly-- yeah, that's right. This is so important, because you can't judge. When you don't have the real implant on, there's no way to judge within millimeters that you're the right size for the implant. This way, you're exactly. And this is, by the way, a fabulous fit. And let me ream it up, and I'll show you the fit. It really just fits this bone perfectly, as our x-ray showed.

**HAAS:**

So all you do is you ream. Again, much more precise than sawing this. You ream, ream. Then you take a box osteotome. You go once. You take the slap hammer, place it on, put it on the top one. Slap again.

And then you're done. And that's the box. You've done the whole box. You haven't overshot, cut too much. You haven't undershot. It's exactly right.

This takes less bone even than the LEGIONS. And the LEGIONS-- we did a study showing how takes much less bone than all the other contemporary knees that we looked at at the time. The other thing is that when you look at most PS knees, a criticism that people had of PS knees historically was, well, you take the bone.

And I think to some extent, you took that bone during revision. But the idea of having two separate free-floating condyles always was a structurally inferior way to have it. Why would you want two separate condyles that looked like they could break off at any time? And while they didn't frequently break during implantation, they sometimes and they certainly broke off when you were revising knees, and you were trying to get the femur off, and you pulled the whole condyle up.

Here, you'll see when I remove this that you have a bridge of bone in between the two that will hold the condyles together. It's much more similar to what it looks like in a CR knee. OK? So tap that down. You get it in, we take the pin out of there. And now I'm just going to take my-- give me a nine.

Now, when it goes in, you're going to feel resistance on the medial side, because if you look at that plateau, you can see that it's dished on the medial side. If you give me a large size, sometimes it shows a little bit better. Here's a larger size. So I know it's a larger size, so I'm not doing this by accident.

But if you look at the dish here on the medial side, it's very dished whereas the lateral side is not dished in this plane. They're both dished coronally. So they both have a lot of dishing in the medial-lateral planes so to provide good contact areas. But sagittally, it is much more dished on the medial side than on the lateral side.

Also, like your bone cut, it's a little thicker on the lateral side than on the medial side just like the bone that we drew on the x-ray and like your bone cuts almost always are. So we're going to then place this in here. We'll place it in. OK. And there we go. And we are out straight.

We'll check our alignment, but it looks good. It looks great. OK. There you go. And for the dangle test, I'll put our patella in, but can someone take a look at the dangle test on that? This is the place.

The average range of motion in the study that we did was 135 degrees. I mean, these bend like crazy. Can you see that from your angle there? There. I'm not touching this, and look at the bending you have on that.

**DR. FRED** Yup. No, it looks very good.

**CUSHNER:**

**DR. STEVEN** And I think equally important is you have now-- come back to this camera-- you have no gapping. It's not like we  
**HAAS:** have this bending. You see this? I'm torquing that thing, and it's not going to open. OK?

**DR. FRED** Show us the anterior cam, Steve. You know, like a Lachman's. Pretend this is sports stuff.

**CUSHNER:**

**DR. STEVEN** Oh, well, the anterior cam probably won't engage here. I'll show you what it looks like, but it's only going to  
**HAAS:** engage. You see, what the anterior cam is is this area is rounded. Give me a cushion. This area is rounded, OK?

So it matches the roundness of the post so that if this were to slide forward, if the tibia's sliding forward because of a load that you have, what will happen is the anterior cam post will engage. It's a very low-contact stress and much lower loads than you have either on the tibiofemoral articulation or on the posterior cam.

On the other hand, it provides stability. And it actually occurs in PS knees, but it occurs randomly and it occurs in a very high-contact stress, because most PS knees have a box. The edge of the box that was never meant to touch anything hit the front of the post.

And we actually did a study that we published in *CORE* on this. And some of the knees contacted very frequently, very frequently. There was a study from the MGH that showed the same thing that many of PS knees will contact them.

Actually, if you're worried about post damage, it's when a high-contact stress occurs when a non-articulated rough or sharp edge of a box hits the post that never meant to have any contact. So this is designed to have contact to keep it low stress.

**DR. FRED CUSHNER:** All right. Go through a range of motion, Steve. Is it getting the rotational rollback that we like? And is the femur sitting on the tibia like you said pre-op?

**DR. STEVEN HAAS:** Well, let's take a look at that. You can see. If you look here, it's a little hard to see in this. Let's have a thin band. I'll try to show it to you. But if you look at it out in full extension, you'll see that you're going to see more of the anterolateral femur than the anteromedial femur. Can you appreciate that?

It's the contact point on the lateral side is more anterior on the tibia than it is on the medial side. The medial side's sitting in the middle. OK. I don't know if you can see that, because I think we're OK on top.

**DR. FRED CUSHNER:** No, we can see it. Just like you said at the beginning of the case, we're seeing exactly what you predicted.

**DR. STEVEN HAAS:** OK. And now as I roll like this, now take a look at it now. OK. Now take a look at the poly here. The contact point here is in the midline. But on the lateral side, the best way is you see a lot more plastic on the lateral side than you do on the medial side. And that's a reflection of that lateral side moving back. It's a simple concept.

It's just if you shape the services like the natural bone, it'll do what it was supposed to do. By keeping the AP position in its natural positions, those collateral ligaments are much better balanced all throughout motion.

Part of the instability people feel, you can never get any ligaments isometric if your AP position is wrong. If you've subluxed your knees in the front-back position, your collaterals are never isometric. Here they're much more isometric because the AP positions on the medial and lateral side are natural.

**DR. FRED CUSHNER:** All right Steve, they're telling me you've got five minutes to cement.

**DR. STEVEN HAAS:** OK. We've got five minutes. Let me look at my patella tracking. I want to just check that out.

**DR. FRED CUSHNER:** Yup.

**DR. STEVEN HAAS:** And she's a TA. She's getting TA? She's part of our TA study, too. So here's our track, and I haven't done any releasing out there. And look at that. No thumbs. I don't use any thumbs. I just check to see.

**DR. FRED CUSHNER:** Not seeing any cheating there.

**DR. STEVEN HAAS:** OK. And let me drop my rod on it, and then we're going to cement. Can you scan our parts, Evelyn? We want a four left, a two left.

**DR. FRED CUSHNER:** Could you show a picture of what's going on here? I think this is pretty interesting. Show us what Evelyn's doing with that scanner over there. OK.

**DR. STEVEN HAAS:** All right. Oh, right down the pike. And I've just checked our alignment. Our alignment's perfect. And that's great. Show the screen just once, and then you can come back to me, because I want to show you it.

If you look at the screen, what we do is we can look over there at the labels. And then we know that what we're doing is the right size. I think that's the right size, right? And it checks to make sure that the left and left and right-- that the left is correct, OK?

**DR. FRED CUSHNER:** Yup.

**DR. STEVEN HAAS:** So we have a two, four, left, left JOURNEY BCS, JOURNEY II. We have a 32 patella. So it's all correct. They're all green checks, green clocks. Hand it up.

**DR. FRED CUSHNER:** Very interesting. And we had a question about the VERILAST. Because a young, active patient, you're going to use the OXINIUM and the cross-linked poly in this patient?

**DR. STEVEN HAAS:** I am absolutely going to use the OXINIUM and cross-linked poly.

**DR. FRED CUSHNER:** Yup. So certainly beyond the scope of a live surgery, but--

**DR. STEVEN HAAS:** And here if you look at the-- you can come back to this camera. You can see the alignment that I'm aiming down at the second ray again. So you dorsiflex the foot. You look to see it's at the second ray. And there you go. We happy? Everybody's thumbs up. That looks great.

**DR. FRED CUSHNER:** I'm happy. Looks good.

**DR. STEVEN HAAS:** Second ray. We checked the alignment. Looks great. I do it also in flexion. Looks great. Second ray. We're going to go. OK, we're ready to cement everything. What's our tourniquet time, Nigel?

**DR. NIGEL SHARROCK:** I think it's about 25 minutes.

**DR. STEVEN HAAS:** Excellent. OK. OK. [INAUDIBLE]. All right. Here we go. Now, here's how we take off the femur. The femur actually-- because you said, how do we get that femur off? All you got to do is you flex it up, and then we pull it off. So it's quite easy to get off. You just flex it, and then it'll come off. And again, easy to implant.

**DR. FRED CUSHNER:** As long as you remember to take out that pin.

**DR. STEVEN HAAS:** OK. So I'll position the leg. We'll mix 101, OK?

**DR. FRED CUSHNER:** Yup. I can see that anterior bone bridge real well that you were describing, Steve.

**DR. STEVEN** What's that?

**HAAS:**

**DR. FRED** I can see the connecting bone bridge between the condyles.

**CUSHNER:**

**DR. STEVEN** Yeah, you're right. I just think that's so much more-- besides it's visually appealing. It's visually appealing,

**HAAS:** because it's structurally more sound. There is no doubt. If you cut these condyles into two condyles-- as a matter of fact, the larger the bone, the less bone we're removing, because the notch gets bigger.

But you've got this whole bridge of bone connecting these two condyles, which is structurally a much more sound construct. You would never design to have those two condyles just free-floating. It is not as sound of a construct. If you go to remove, it's much weaker. And it takes more bone that you just don't need to take.

**DR. FRED** Yeah, I know.

**CUSHNER:**

**DR. STEVEN** All right. I always check for any high spots of the cortex. We're OK. That looks great. I think we look good here.

**HAAS:**

**DR. FRED** And your exposure certainly is pretty good for that small incision.

**CUSHNER:**

**DR. STEVEN** Yeah. Well, with women especially, this is not very difficult to do. I think women are flexible, not rigid like men.

**HAAS:** Always remember that the polyethylenes are left and rights here. So you have to check that the polyethylenes come in left and rights. Everything is anatomically shaped. If you're looking at this-- is our camera on here?

**DR. FRED** Mm hm.

**CUSHNER:**

**DR. STEVEN** You'll see that the lateral side is thin on the lateral side where we lost our posterior bone cut. But if we looked at our-- there's our distal bone cut. It's going to be very similar cut. Now, you see that? So very similar to our bone cut. And the medial side conversely is similar to the medial bone cut. Are you seeing that?

**HAAS:**

So in the posterior, cuts are going to be the same. Posterior cut is going to be-- it was thicker on the-- oops. Sorry. It was thicker on the medial side, again, like our posterior cut here. And the lateral side was thinner.

Again, this isn't rocket science in the sense of it just follows the natural anatomy. Just if you looked at what the bone cuts look like minus any wear that you had-- you take a normal knee or a patellofemoral arthritis knee, and you look at the bone cuts that you do in the standard knee, which we're all happy with, there's no reason why everything has to be symmetric. The only reason why traditional total knees have the same thickness on the medial and lateral condyles is because the total condylar had that 30 years ago.

**DR. FRED** Mm hm.

**CUSHNER:**

**DR. STEVEN HAAS:** 0 Because nobody thought to change it. It's actually remarkable that total knees over the years, the only thing that became left and right on most system total knees was the fact that they had a trochlea that angled a little bit up so that it angled up the middle of the femur. OK.

So I've marked off the rotation line. I place this down. I've got my fins. The nice part about having these fins is that they guide our rotation, so I can engage it. So it's engaged to pins. We then take this and just impact it.

**DR. FRED CUSHNER:** Yeah, it's nice that that posterolateral hits the condyle, you don't get internal rotation of the tibia with those fins.

**DR. STEVEN HAAS:** Yeah, it's hard. You know when you have those sort of rectangular pegs, they're so easy to internally rotate. And remember that posterolateral femur is oftentimes close to or hitting the posterolateral tibia so that in that situation, it can cause your implant to internally rotate.

The other thing is it's good to see that some of the manufacturers are switching off to asymmetric. We've had asymmetric tibial baseplates since I've been involved in 1997. And there is no reason. We all know the tibia is asymmetric. I think that all tibial baseplates. Besides that they get better coverage. Better coverage is only the small part of it.

The biggest reason, though-- there was a great study by Incavo that was presented at the Interim Knee Society that showed that you much more likely mal-rotate a knee that has symmetric baseplate, which makes sense. Because it never looks like the tibia. It never looks like the tibia that you're replacing. Whereas when you have an anatomically-shaped tibia, it generally looks like the tibia you're replacing.

Can I have a small curve-cut? David, do you have this one? Oh, here you go. OK. Just want to make sure we're all clear on the cement. Good? Good. That's all clear. That looked great. That was super.

I put up a little protector plate, because I don't want to scuff up my condyles. You want to keep the uni. I think that scratching is a major cause of wear. So we don't want to scratch it going in. So we put this plate under there to protect it. Your CR.

Obviously, you have your poly that you can place in there. The way I cement the condyles, I do not cement the posterior condyles. I put cement on the implant.

And actually, one of the nice parts here is in a traditional knee replacement, you're sliding it on. Actually, with this, you're just compressing the cement as you go, because you are in fact-- as you extend it, you actually pressurize cement in both the anterior and posterior condyles. So it's actually, I think, a nicer way.

We get MRIs on our knees. And you can actually see with OXINIUM, which allows quite nice MRIs. OK. You will see that. All right. That looks fabulous. OK. So again, all we do-- flex the knee a little bit more. OK. Is I put it under the condyles, line up the box. It's flexed. Bang it on.

And now bring it up to extension. Bring it up. And then I hit it. There's a little chamfered part of that not hitting the extension. And then knock it down some more. And that's it. And that's on. That implant is rock solid on there.

So can I have the impactor? And I give it my last love taps. Ba boom. Done. Now let's have this. Oh-ho. Look at that.

**DR. FRED CUSHNER:** Looks beautiful. From the audience, if there's any last-minute questions, I think we've gone through all of them that have been asked so far. Please ask now.

**DR. STEVEN HAAS:** Can we get a look at the fit on that just to take a look? Again, it's not hard. You know, when you looked at this, you said, well, are we going to have any trouble? And it's interesting. As we went from JOURNEY I to JOURNEY II, there was an issue. You said, well, this is an opportunity to make anything better.

**DR. FRED CUSHNER:** It's not working here.

**DR. STEVEN HAAS:** And everyone agreed that those flex condyles just made sense. Boy, it was easy to get on. The bio-mechanical data says it's better.

**DR. FRED CUSHNER:** Doc?

**DR. STEVEN HAAS:** What? Huh? All right. Yeah. Have a good line. Yeah. Let me trial it first. Oh, no, I'll go on here. David wants me to make sure I get things done before my cement's hard. Let's put our poly in. I always compress it. How's the cement doing? We're OK. Good. OK.

**DR. FRED CUSHNER:** OK, thank you.

**DR. STEVEN HAAS:** Here's a good way you can clean the cement up front. I do it when they're fully extended. That way we can see. That's very nice. Beautiful. Notice we're right on that cortex. Can you see that?

**DR. FRED CUSHNER:** Yup.

**DR. STEVEN HAAS:** Right on the cortex there. Beautiful. Perfect. Perfect, perfect. Ashley, you did a good job. OK. Out nice and straight. OK. And we want a nine. Now, the polys come in one-millimeter increments. But the nine is great. So you can give me a nine poly.

So Evelyn's scanning our nine poly. Again, our system checks to make sure that everything's left, the correct side, not expired. And I can see it is nine millimeters, one, two, BCS. Hand it on up.

Beautiful. All right. Then bend. OK. Can I have a bovie ovie? There's a little cement I want to get out. There. Excellent. Cushion? Cushion, cushion. There we go.

**DR. FRED CUSHNER:** All right.

**DR. STEVEN HAAS:** So I always check the dovetail to make sure it's not got any cement or bone or anything in it. It looks nice and clean. Good. Poly's east to get in. You just take the poly. And you see a little snap on the medial side. That says it's going over that lip, there's a locking tool. You just place the locking tool in. Boom, it's in. That's all you got to do to put it in. Boom. We're there.

Oh, beautiful. OK. OK, coker. And wash it up. OK. Beautiful. So we're just cementing the patella. I always want to pressurize.

I very frequently mix a separate batch-- or the batch for the femur and patella, because I want that cement nice and liquidy soft to go into the patella. Because it's often not that porous of a surface. And that is it.

**DR. FRED** Oh, it looks good, Steve.

**CUSHNER:**

**DR. STEVEN** OK. There are questions? We have more questions?

**HAAS:**

**DR. FRED** I asked for questions. We have no more questions.

**CUSHNER:**

**DR. STEVEN** No more questions. OK.

**HAAS:**

**DR. FRED** I think you reached your hour.

**CUSHNER:**

**DR. STEVEN** OK. Everybody, it's time to have a drink and dinner and enjoy.

**HAAS:**

**DR. FRED** Absolutely.

**CUSHNER:**

**DR. STEVEN** All right. That looks great. Oh, that looks perfect. OK.

**HAAS:**

**DR. FRED** All right. Any closing remarks, Steve?

**CUSHNER:**

**DR. STEVEN** What?

**HAAS:**

**DR. FRED** Any closing remarks as we sign off from New York?

**CUSHNER:**

**DR. STEVEN** No. Thank you very much for joining us for our JOURNEY knee today. And thank you to my team here. And thank you to Dr. Cushner for a great job moderating. And Dr. Mayman, thank you down in Orlando. Although you're down in Orlando, it's cold up here.

**DR. FRED** All right. What's our tourniquet time, Dr. Sharrock?

**CUSHNER:**

**DR. NIGEL** 56.

**SHARROCK:**

**DR. FRED** So cemented, ready to close. One hour, small incision, good alignment, good gaps. I would say you did a job well done, Steve. Thank you so much.

**CUSHNER:**



**DR. STEVEN** All right. Thank you, everybody.

**HAAS:**