

Zimmer Combines Gender Solutions technology

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Good evening. Welcome to "OR-Live" at Tampa General Hospital. My name is Steve Lyons, a staff surgeon at Florida Orthopedic Institute in Tampa, Florida. Tonight I'll be moderating a Zimmer Gender Solutions total knee, performed by my partner, Dr. Ken Gustke. At any time during the broadcast, please feel free to e-mail us questions via the e-mail seen on your screen, and I'll do my best to sift through those questions and get them to the operative team. Right now I'm going to turn things over to Dr. Gustke, who is live with the patient right now. Ken.

Hello. I'm Ken Gustke, and I'm going to be doing a total knee replacement utilizing the Gender Flex implants on a 79-year-old female. You can see the X-rays of this patient. She has classic osteoarthritis of the knee. She has bilateral osteoarthritis. But her left knee is much more symptomatic than the right, so that is the knee that we're going to be doing today. You can see that the medial wear pattern present, as well as some posterior osteophytes on the femur that we'll need to resect during the surgery, and the patient has patella femoral arthritis too, and our plan is to resurface the patella as well.

So if you can go ahead and we've already made our incision. The length of the incision I've found through experience is really unrelated to the success of the patient. It's more cosmesis. And so typically I now make an incision that runs around 15 centimeters in length, and that gives a utilitarian incision for me to be able to do a sub vastus approach, which is what I'm going to do today, going under the vastus medialis, giving me the potential for a quicker recovery or rehabilitation of the patient because the patient will have better quad function. Brakes, please.

So it's important doing the subvastus approach to do the dissection medially along the vastus medialis. Also to release the vastus from the under lying subcutaneous tissue so that when we mobilize the quadriceps laterally, the skin doesn't have to come with it. So now with my finger I develop the interval underneath the vastus medialis and elevate some of the vastus medialis from the intramuscular septum a length of my thumb.

So now I'm going to do the medial arthrotomy, so I'm going on the medial side of the patella tendon, up to the medial side of the patella, up to where the vastus medialis attaches to the medial side of the patella, which is usually around the midpoint. There's still going to be a retinacular attachment that I'm going to elevate and then take the vastus medialis up from the underlying capsule.

Now I'm doing my medial arthrotomy. I'm in the infrapatellar bursa, releasing the fat pad and the ligamentum mucosum. Now at this point the quadriceps is relaxed but still doesn't subluxate to the extent that I need to get it over the lateral side, and that's because the vastus medialis is still being tethered by the superior capsule. So I'm going to divide the superior capsule, and then this will untether the vastus medialis from that capsule and allow the patella to move over more laterally. I also check to make sure all my adhesions are gone, and then this will allow my patella, as you can see, to come over laterally. And on the way out, we will repair that vertical incision in the superior capsule. Knife. Pick up.

So now I'm going to do an anterior-medial release from the medial meniscus. It's important to maintain this as a contiguous soft tissue flap, which will be important for closure. When these tend to drain postoperatively, they tend to drain through this area because of an inadequate closure, so keeping this as a continuous flap is important. Now I do my release nowhere past the posterior -- past the midpoint of the tibia because I basically can't see posteriorly.

Now you can see there are medial osteophytes, which I'm going to resect at this point, because they actually aid in the initial exposure if you take the osteophytes out. You have less tethering of the soft tissue over those osteophytes.

Ken, how often do you use this approach, and what patients would not be a good candidate for this approach?

I use this approach at about 80 percent of my patients. The patients who are not good candidates for this approach would be those that have a lot of scarring in their knee from previous surgeries, patients who are extremely heavy or extremely muscular, where I think I'm going to have difficulty getting the extensor mechanism moved over laterally. I've resected the anterior third of the patella fat pad so I could see down into my lateral compartment. And I'm removing some lateral osteophytes, which, again, will help me getting my patella subluxated laterally. Now I put a retractor in the lateral compartment.

Would you still use this approach on someone that's had an old meniscectomy scar from 10, 20 years ago, or would you do a median patellar?

No. I would try to do this. It really depends on how supple the soft tissues are and whether the extensor mechanism will move. If a patient has a long, very long incision from a previous meniscectomy, I get concerned that their may have been a lot more scarring that's occurred. But if it's a smaller incision it's still a doable procedure are. So I have taken out the anterior part of the medial meniscus, and now I'm going to take out the anterior portion of the lateral meniscus.

This patient has a minimal remaining anterior cruciate ligament. I'm also going to remove the osteophytes from the inner collar notch so I know where the true center of the knee is. So you can see the wear pattern is what we expected from a varus gonarthrosis. There's no cartilage remaining on the medial femoral condyle. There still is some cartilage laterally and there's also partial wear in the patella-femoral compartment. The three-quarter inch osteotome.

I want to allow for some external rotation of my femoral component, and I do that by resecting the remaining cartilage off my posterior medial femoral condyle and leaving the cartilage laterally, and that will give me a degree or two of external rotation when I use my posterior condyles as a reference point. The starting hole is just proximal to the origin of the posterior cruciate ligament, which is a few millimeters medial to the midline of the inner collar notch. I rout out the hole, so when I pass my drill in I don't have any pressurization of the canal, creating a potential for embolism.

I've chosen this patient a six-degree valgus alignment of the distal femur, which is adjustable with this jig. The initial setting for the distal femoral resection guide is making these parallel to the posterior condyle.

Now, Ken, are you dialing up on that jig to account for cartilage loss and bony erosion?

Right now it's up against the lateral condyle, and it's up in the air on the medial side. So if I needed additional stability, I could dial down on this medial side down to the bone.

And, again, I want to remind our viewers to e-mail their questions that may arise, and we'll ask them live on the air here.

So I'm using the zero hole on the distal femoral cutting block. That gives me some versatility since there are four holes. It allows me to move it up or down if I need to if I determine that my resection on my distal femur is inadequate and I need to resect a few more millimeters of bone.

Now, Ken, the jig that we just saw, is that an MIS-friendly jig as well?

Yes, it is. It's small. These surgeries can be done with incisions that are a little bit smaller than what I'm doing here today. But as I said earlier, the minimally invasion of this surgery is actually not cutting the muscle. It's more so than what I've accomplished with my skin incision.

I'm checking my resection to see that so far everything seems to be appropriate. I'm going to replace ten millimeters on the distal femur. My medial side is measuring eight, and on my lateral side I'm measuring ten, which is what I'm going to replace. If I did not see ten on this side and I was seeing that I was resecting less than normal, I would then take this jig, pull off and put it in the next higher holes and allow me to resect two millimeters of additional bone. So now I'm resecting the distal femur.

Ken, we have a question. The question is, "Does Zimmer offer the use of computer assistance in the surgery?"

Yes. I do most of my younger patients with computer navigation. I believe that that does help with the overall alignment of the knee. We're trying to get it as close to the knee, the hip, and the ankle being in perfect alignment, and we know from our literature that if we get it within four degrees of perfect alignment that there's a greater longevity to the knee. And I think with use of computer navigation we can obtain that essentially a hundred percent of the time. So it's an advantage for a young patient. I don't see much of an advantage if the patient is elderly.

So now I'm putting my sizing jig on the distal femur. I'm centering it utilizing the line that's on the jig to the hole that I've made in my distal femur and also using this jig to line up the trochlear groove. So far the alignment medially laterally is appropriate. These are up against the posterior condyles, which has the cartilage removed medially and still intact laterally, which is giving me a few degrees of external rotation, so I don't need to use the jig to dial in extra rotation. But if I was doing a valgus knee and I needed to do that, I could just click down this instrument here and that will give me three degrees of additional external rotation.

So just to clarify, you do not always click that jig down for three degrees of external.

No. No, do not. Because I have already created external rotation by having no cartilage on the medial side and having retained cartilage on the lateral side. So now that you go ahead and size it, holding the stylus up against more of the lateral side of the distal femur, and I'm between a size one and a size two. So this is a female, so I'm going to see how a size two will fit. So I take a size two female, hold it up against the distal femur and determine if I have any medial lateral overhang, and it actually looks perfect. It looks appropriate to my anterior/posterior dimension. If I found that with the female that I was getting overhang, I would then have an option of using an anterior shift block or cutting the distal femur in three degrees of additional flexion, which would then allow me to downsize my femur and not notch anteriorly. If you can give me the male size two.

You can see that there's a difference in the gender knee between the males and the females. Females tend to have narrower condyles from medial to lateral, and they have a smaller anterior femoral flange. So this a male, and you can see the female, with a difference of about two millimeters on either side of overhang. A male you see on this patient would have overhang on both medial lateral sides of the knee, which would tend to rub against the soft tissues, that could be a source of pain. She can also see that the female has a smaller anterior flange, and there's also a subtle difference in the trochlear groove angle in the female versus the male.

So we're going to pick a size two, and using the angel wing you can see that I'm not going to notch anteriorly, so two looks like to be the appropriate size for this patient. You can additionally fix the block so your assistant doesn't have to hold down on the block.

Do you routinely pin the block?

Yes, I do. I don't think it's absolutely necessary, but I do think that it does stabilize it a little better. On younger patients I do cement less knees, which accounts for about 20 -- 25 percent of my practice, and I think it's even more important that you have very accurate bone cuts, and by pinning this block down you get a much more accurate cut.

So one of the questions that we just had come in, Ken, is "How many of these patients do you cement?" Would that be 80 percent then?

80 percent. Only because of my patient population.

Yeah.

I've had excellent results doing cementless fixation on younger patients, with very aseptic loosening of any of the components over the 20-year experience utilizing the natural knee device. Now I can't say that using cementless fixation on an 80-year-old is a good idea or it will work, but I know people that have done that and successfully. But there are some cost issues between cements and cementless implants that have to be considered. I make that initial saw cut for the notch so I'm less apt to blow out the anterior cortex utilizing the chisel.

I see that you put that chisel in upside down for the first pass. Does that play a roll?

Yes I think it helps, again, removing the piece of bone without -- especially if the patient has very hard bone, you can take out too much anterior cortex inadvertently by going in straight with the chisel.

Ken, here's another question. "This being a posterior referencing system, how many times do you find that you notch the anterior femur?"

I never notch, because I take that into consideration when I'm sizing it, and if I see that it's going to have a potential -- number one, notching tends to occur more often in females that one is not using a gender knee because you're trying to not overhang medial laterally, and your tendency is to put a smaller component on, which can notch. But if you see at surgery you're not going to have a good fit and medial/laterally and needed to downsize it, we have the option of flexing the distal femur or using the anterior shift block so that you don't notch. Can I have a narrow blade, please. I have a little retained bone here medially, probably from osteophytes that didn't come out with my first cut, so I'm going to resect it under direct vision.

Ken, we have another question here. It says, "I'm a 55-year-old male. I'm considering the Zimmer high-flex knee. How does this knee differ from the high-flex mobile bearing knee?"

Well this is not a mobile bearing knee. There is a lot of controversy as to whether or not a mobile-bearing knee provides any significant benefit to the patient. I don't believe that our orthopedic literature supports any significant advantage of using a mobile-bearing knee. I think there's some potential disadvantages of using a mobile-bearing knee. If the implant were to spin out you can have dislocation issues. So mobile-bearing knees require absolutely perfect balancing of the flexion/extension spaces otherwise they have a potential for higher complications than using a conventional fixed-bearing knee, which as I said earlier, has as good of long-term results as mobile-bearing knee does. Okay.

So I have completed my femoral resection. Now I'm going to do my tibial resection, so I put the large bent knee lateral to the posterior cruciate ligament, and I want to complete a medial soft tissue release at least to the midline to allow my tibia to come forward on the femur. So I'm resecting the remainder of my medial meniscus.

Ken, while you're doing that, we have another question. "Can you comment on what you consider the quote, unquote, younger patient?"

Well, obviously patients that we feel because of their health and age has the potential for a total knee to last more than 20 years, because we know with our current results with a traditional cemented knee that we can get 90 percent plus good results out at 20 years now with a conventional cemented total knee, so that becomes our gold standard. And if we need a patient who is going to live longer than 20 years, then we have to think of some other potential alternatives that may give them a longer-lasting knee, such as cementless fixation of components rather than using cement or having a more perfect alignment so that they'll have less polyethylene wear over the long term.

We're getting a lot of questions on cementless technology here. Here is another one if you can answer this quickly. "How much longer is the recovery on a cementless knee system?" So do you do anything post operatively to augment a patient that you have done cementless?

No, not at all. The patient who I do a cementless knee on is rehabilitated exactly the same as a patient that's had a cemented knee. My patients that have sub vastus approaches such as you see here will be allowed full weight bearing starting tomorrow. They will be allowed to go to a cane as soon as they have good balance. They will be allowed to start resistive quadriceps and hamstring exercises as soon as they're comfortable. The protocol is exactly the same whether they have a cemented knee or a cementless knee.

Ken, it looks like you're saving the PCL. Do you do that what percent of the time?

About 20 percent of the time. But I go through the motion every time.

So you make that ultimate determination at the end of the case?

No. I do that once I put my trial components in to see whether the posterior cruciate ligament is balanced and functional. If it's neither -- if it's not balanced appropriately or not functional, then I have no qualms about going straight to ultracongruent liner, resecting the posterior cruciate ligament and substituting for it because I know the results of the ultracongruent liner are essentially equal to those of the posterior cruciate retaining devices. But I think patients that have a posterior cruciate ligament have a little bit better proprioception on going up and down stairs than perhaps a patient with an ultracongruent liner.

Okay. So now I'm going to line my tibial jig to the ankle, and this is a little bit of varus alignment to the natural tibia, so I'm going to build in a little bit of varus to my cut, about one to two degrees, so I place this a little bit lateral to the center. I'm now going to reproduce the posterior slope of the tibia. This is important, especially if you're going to try to retain the posterior cruciate ligament to balance the posterior cruciate ligament, because if you make too little slope on your tibia, then the posterior cruciate ligament jams the knee during roll back and doesn't allow very good flexion. So I do put the primary stylus on the more normal side. This will resect seven millimeters below that point.

Ken, we have another question here. It says that, "I noticed that you finished resecting the femur prior to resecting the tibia. How do you know that the knee will be balanced?"

I don't. What I'm doing is doing what's called "measured resection," so I'm using my alignment and I'm resecting bone to be able to replace what I have resected, and then once I've got my components, my tibial component and my femoral component in independently I will then assess my soft tissue balance, and if they're not balanced then I will balance the soft tissues. My premise is that a lot of arthritic knees are because of alignment issues that are inherent -- that are based on hereditary, and if you were to make your cuts based on a previously bowed leg that's been in a varus alignment all their life, then you're going to basically recreate another pathological situation, which can then lead to increased wear of the polyethylene, so it's better to line the leg to what is best mechanically.

So I'm looking at my alignment jig, and I'm just slightly lateral to the center of the tibia, so I have about one to two degrees of varus with this current alignment. If I didn't like what I was seeing, I would have the option of putting on a varus valgus block, varus valgus, which would simplify my ability to readjust this cut. So I have used the varus valgus block, put it on there in either direction, whether I need to go to more varus or more valgus. It very much simplifies it. It doesn't require me to put my jig back on and put all the pins back in again.

So to clarify, if you had too much varus on your alignment rod, you would then put the varus valgus block on to bring you into more perpendicular orientation?

That's exactly right. So the next step is to see how much bone I'm going to resect from the worn side. You can see that utilizing the angel wing I'm a little bit high, so I have the ability now with this jig to just drop down in two-millimeter increments until I have an appropriate resection right next to the cartilage cap where the cartilage ends on the edge of the bone. I'm going to put a osteotome in front of the posterior cruciate ligament, again, with the premise that I'm going to retain the posterior cruciate ligament so that I don't inadvertently cut through it with my saw.

You can see we're constantly irrigating the bone so that we don't burn it with the saw. Because this is a small tibia, the oscillation of this wider blade prohibits me from cutting the posterior condyles with the osteotome in place, so now I'm going to switch to a little bit narrower blade to finish the cuts posteriorly.

Ken, for the benefit of the audience who is not an orthopedic surgeon or physician, can you describe or clarify the burning of the bone a little bit more. I think you're referring to the thermal necrosis.

Yes. The temperature that's elevated from the saw cutting the bone will cause the bone to develop thermal necrosis, or burn the bone, in a sense. And that will actually kill the bone, and when you put either a cementless implant up against it you're relying on live bone to grow up into the prosthesis, and, of course, that wouldn't occur at all. But even when you're cementing you want to put cement against indigitated into live bone instead of dead bone because that dead bone can necrose and go away and essentially inhibit your future fixation. Saw, please.

So now I'm going to just complete that cut. I don't leave a bone island posteriorly. I want the posterior cruciate ligament stand up on its own without a bone island, because I don't want it to rupture postoperatively and affect my long-term stability if I have not substituted for it. Okay. Now if I can have the resected piece of tibia.

So one of the major features of the natural knee is the asymmetrical tibial base plate. You can see on this it's quite exaggerated, but the medial side is significantly wider front to back than the lateral side, and so we use an asymmetrical base plate to give us better anterior/posterior coverage on the medial side compared to the lateral side, so we either don't have overhang laterally or undersizing medially, which is in soft bone, potentially in a valgus knee, can allow for subsidence. I'm now going to remove my remaining medial osteophytes.

Ken, have another question here. It says, "I noticed you use the seven-millimeter resection stylus. How do you explain that you're cutting a seven-millimeter piece of bone but replacing it with an eight-millimeter piece of articular surface?"

Actually it's a nine-millimeter articular surface, and I purposely put the stylus on the normal side on the lower point and not on the highest point. So I don't have a problem with an unresected tibia.

And then in heavyset women with lax collaterals, do you resect less tibial bone?

Usually you don't see that. In the heavysset patient you don't see that. You see that kind of scenario in, say, a rheumatoid, that has a lot of synovitis. You can actually raise up and make less cut that so that you're maintaining the better subchondral bone. Okay. So now I'm checking my fit out against the lateral cortex. I'm sitting on the medial cortex fine. My overall rotation relative to the tibia tubercle is appropriate looking down the slot. So this is the appropriate size for the tibia.

Alignment bar and I can double check it. And I'm happy with my alignment. I'm just slightly lateral to the center, between the maleoli, giving about one or two degrees of varus alignment to the tibia, because the patient has a natural varus alignment to the tibia. So I'm putting this punch in about 75 to 80 percent of the way down. I don't go all the way because even if I'm going to cement the tibia with the four peripheral pegs on the tibial base plate providing the best stability because it's in the best bone, you can press fit this tibial stem, not cement it, so I'm going to ultimately press fit it so I don't have to go all the way down with the broach.

So you're saying that aids in the fixation of the tibial face plate instead of using a reamer or some other device that would ream out that bone?

Yes. And it's more conservative because you've left a lot of the bone still in the central part of the tibia, so if you were to have to revise the tibia for infection or some other loosening situation for the long term, you're going to have better bone in the central part of the tibia, because you have filled it with a big piece of metal and a lot of cement. So I have now removed my posterior osteophytes, which are important to do to maximize flexion.

And we have another interesting question. It's a little bit longer, many variables and so forth in a generic idea. But they want to know how long does it take a patient that you've operated on to walk pain free using this Zimmer Gender Knee?

Patients are different in terms of their pain tolerances. But it's not uncommon for patients to be able to put their weight on it the next day without a lot of discomfort. It's usually soft tissue discomfort that they have, and so if you minimize how much soft tissue dissection that you do, i.e., not cut through the quadriceps, I think that they have the potential for less pain. There's no such thing as a painless total knee, but it's not uncommon for patients to come back to the office at six weeks and not require any additional pain medication.

Okay. So now we've removed our osteophytes. Now we have decompressed the knee by doing our tibial and femoral resections. I'm going to go ahead and resurface the patella. I'm going to try to replace what I resected. This patella measures 21 millimeters so that's what I want to end up at. I have the option with this system of replacing eight millimeters of ten millimeters for the same size. I put the jig on parallel with the dorsal surface.

Ken, can you describe how do you determine the position of the patellar implant?

I tend to medialize it. One trick that I didn't do here, which you can do, is to drill a hole at the highest point of the tibia in the center and actually go down towards the dorsal cortex, so once you make your resection you will see where your hole actually lies. I'm going to resect a little bit more. I'm a little thinner on the lateral side than I am on the medial side, so I'm not real happy with that, so I'm going to freshen that up a little bit.

Are there any cases where you just ream the patella instead of osteotomizing it?

No. I osteotomize it every time. But if I'm too thick then you can put your sizer and then your reamer and ream it down to the size you want. So now I'm measuring 13 millimeters, and I'm equal in all four quadrants of the patella, so that will take me back to 21. So I want to maximally fill the patella to proximal to distal. It looks like a size one. So I'm lateralizing the patella.

You're lateralizing the patella and medializing the implant?

That's correct. I'm medializing the implant. I'll take a size one trial, eight millimeter.

Do you use any metal-back patellas?

No, I don't. Even when I do a cementless knee, I do a cemented patella. I have had excellent long-term results with cemented patellas. So now any retained bone on the lateral side I can taper that off. Okay. And you can see the overall thickness of my composite is going to be 20 -- 21 millimeters.

How about the shape of the patella?

Pardon me?

How about the shape?

It's a sombrero shape. It articulates well with the femoral notch. Okay. So now I'm going to trial and do whatever soft tissue balancing I need, since my alignment of the components is based on anatomic points.

Ken, here is another question. "Do you always resurface the patella or just with patients that have patellar/femoral arthritis?"

I personally resurface the patella and in all patients, and I do that because some patients may have some discomfort postoperatively and sometimes it's difficult to determine whether it's coming from the patella that you didn't resurface. I've had extremely low complications by resurfacing the patella. In other words, I don't have loosening, I don't have balance issues, I don't have wear issues. So I don't see a problem not resurfacing -- I don't see a problem with resurfacing the patella, so I eliminate some potential variables in the recovery of the patient if I don't.

Okay. So I have a perfect fit, and it fits the femur well. I don't have any overhang, so the female fits this female very well. So now I'm going to check my soft-tissue balance. I hold it in flexion. I check my medial varus valgus stability in flexion, in mid flexion, in near full extension, and I have about a millimeter of gapping equally, medially and laterally, so I'm very happy with the balance. And if I didn't like it I would do a medial soft tissue release. If I was too tight medially, or I would do a medial tibial band release if I was too tight laterally.

Now I'm going to assess my posterior cruciate ligament function. So I put my knee up at a 90-degree angle and I assess how much roll back I have. Now true roll back should be more on the lateral side than the medial side. So if I see the femur sitting more than two millimeters posterior to the center line of the tibial component, then I know my posterior cruciate ligament is too tight. And in this particular patient it is sitting back a little too posterior. The other thing I will assess is the stability of the posterior cruciate ligament by doing a forced posterior drawer of the tibia to see if it will rupture. And in this particular instance, her tibia is fine, but, again, but I'm concerned because I have too much roll back. So I'm going to go ahead and resect the posterior cruciate ligament on this patient and substitute for it. Now you can see how the tibia just went back as soon as I released that, so that excessive roll back has now ceased. See how it's moving back?

So taking the PCL gives you a little bit more room in your flexion gap?

A little bit, but it's not really why I'm doing the posterior release. I'm doing the release because the posterior cruciate ligament is pulling the femur back on the tibia too far, and it's going to cause abnormal loading of the plastic posteriorly, which will wear it out and won't allow the patient

to get as much flexion. Okay. So I need a size two femur -- is it a two or one -- one tibia. I need a nine ultracongruent liner and a size one eight patella.

Ken, are you ever worried about underhang of the femur, meaning if it appears to be a little smaller?

No. Everything is fine. I'm not concerned about underhang.

We have another question here, Ken. It says, "Why medialize the patella," if you can address that?

Because that's the normal position of the -- the highest point of the patella is actually a few millimeters medial to the midline of the patella, and so if you were to put the patella in the center or lateralize it then you're going to have more of a tendency for the patella to maltrack.

Have you noticed better flexion results from your patients that use the Gender Natural knee flexion.

Yes. I believe that the patients are flexing their knee better faster and overall are getting about five to ten degrees more ultimate flexion utilizing the Gender Flex.

And, Ken, we have some more questions all hovering around the ultracongruent design. Can you comment a bit more on the ultracongruent liner.

Okay. Let me just wash this up first.

Sure.

And then I'll show you the difference. Jose, if you can bring up a ultracongruent liner trial and a congruent liner trial and a femoral component so I can demonstrate the articulation between the two. Okay. So this is the trial femur and a ultracongruent liner. We have no congruent liner trial. But the ultracongruent liner gives you a higher ramp anteriorly, which gives you stability against posterior subluxation throughout the entire knee range of motion. A congruent liner, here we have a congruent liner, has less on an anterior lip, and so it's totally relying on the posterior cruciate ligament to keep the femur from subluxating anterior or the tibia from going posterior.

I think it's also important to note that you're actually substituting for the PCL and not resecting any more of the distal femur, so you're not cutting a box out.

There's no box cut at all with the ultracongruent liner, so it's a much more conservative knee replacement and it's much simpler so you just make the decision whether you're posterior cruciate ligament is functioning or not, just like I just did. Can I have a large tibial punch.

And really you just need the same femoral inventory whether or not you're going to substitute for it or not.

Yeah. And if you were to have a situation where a patient ruptures their posterior cruciate ligament post operatively, you could go back in on that patient and just replace the liner and not even have to touch the femoral component. It doesn't happen very often, but it does happen. Okay. So I'm putting cement on the bone, as well as on the implant. Again, I don't put any cement down inside the tibia.

Some viewers have noticed that you haven't looked at the patellar tracking. Can you comment on when you look at the patellar tracking.

Yeah. The patellar tracking is done at the end of the case because it's influenced by the tourniquet being placed. So I don't make any decision on the patella tracking at this point. This is Palicose [PH] bone cement that I'm using that has Jenomycin in it. For 20-plus years, I've been using cemented implants. I've always used antibiotics to the bone cement, and think has been validated by the Swedish registry study that shows that there's a lower incidents of infection when antibiotic cement is utilized.

Now putting in the liner, you have to engage the posterior tangs. That's facilitated by putting the lateral side in first and then rotating the medial side in, which then allows a little click. You then go ahead and pack the liner in with the appropriate ultracongruent side. That now engages it. And if I'm up a little bit on the lateral edge because there's a little tang on the medial lateral edge you could actually use the polyethylene impactor and just impact down the last amount at the edge.

Ken, some more questions here. "How often do you end up resecting the PCL?"

About 75 to 80 percent of the time.

And by using the new Gender design, have you found that you don't have to make aggressive releases medially and laterally to accommodate patellar tracking and soft tissue balancing.

No. I don't think that's changed it at all. I think the real key to not having to do soft tissue balancing is your overall alignment of the knee to begin with. And it doesn't matter whether you put in a gender knee or a high-flex knee, it's not going to affect your collateral ligament balancing. It has no bearing on it.

Ken, can you comment I guess kind of in the middle of this here, whether or not you use spinal or epidurals is your preference, and what do you do for post-op pain management?

Patients are under a spinal anesthetic and most of them have a supplemental light general as well, but it's mainly the spinal anesthetic that we do the surgery under. We use femoral nerve blocks on all patients. That helps with post operative pain management. We give the patients an anti-inflammatory medication and usually Oxycontin or a longer-acting narcotic pre-operatively as well so that we have this multimodal pain management modalities being utilized.

Do you ever inject the posterior capsule?

Yes, we do. We use a cocktail of Ropivocaine morphine, epinephrine, and Depo-Medrol. And that's done after we have all the implants in.

Ken, here is another question. "Why don't you use cement down in the tibia?"

It's not necessary. There have been some biomechanical studies years ago showing that the four peripheral pegs provide as much stability as you need without cementing the stem. In fact, the original match only one when it first came out didn't even have a central stem on it. It was just the four peripheral pegs. And I have many of those that have survived 20 years. So I think that clinically supports what's been found in the lab with the stability with the natural four peripheral pegs being in the best subchondral bone.

So it would be important to clarify that the particular design of this natural knee allows you to forego any cement into the tibia.

That's because of the four peripheral pegs. There have been other designs made by other manufacturers that have actually shown inferior results with just doing surface cementing of the tibia and not cementing their stems because they do not have the peripheral pegs. They just are relying on the stem only, which you then need to cement.

Correct.

Okay.

Ken, any comments on the enhanced congruency of the ultracongruent and the perceived lower wear rates that you might get with such a device?

You know, I don't believe the ultracongruent wears any better than the congruent, because the congruent allows for more mobility from roll back of the -- but I think ultimately it really doesn't make a difference. There's been some people who are concerned that the ultracongruent could have more wear because it's more congruent. Let's have a rake, please. I'm just doing a little partial synovectomy now because it's very thick redundant synovium in the super patellar pouch. I don't want any of the soft tissue to get caught in our patella femoral compartment.

Ken, here's another question. "Do you utilize highly cross linked polyethylene for all your total knees or just in younger patients?"

I use the highly cross linked polyethylene in all the knees. I think that's been a major advance in long-term wear, particularly in preventing backside wear between the tibial polyethylene and the tibial component where you can see more debris initiated than you can in some knees from the articular surface. And so having that highly cross linked polyethylene may lessen the wear from the undersurface of the tibial polyethylene. You have some cement that I can evaluate?

Is there any cut-off age that you would put in regular polyethylene or all comers get it?

In patients that are the age of 80, I have used all polyethylene tibial components with extreme high success rates because of their low demand and the fact that they don't need a 20 or 25-year knee, and they have functioned extremely well.

Here is another question. It says, "Have you noticed having any difficulty seating the liner or any issues with the locking mechanism for the poly?"

We're trying to lessen backside wear with the polyethylene, so we've enhanced the locking mechanism of the polyethylene to the tibial base plate, so it's harder to get it in, but that's an advantage for the long term. And if you go through the techniques as I showed where you actually engage the lateral tang, and then rotate the medial tang, listen for the click, and packed in the anterior part, and then if there's still any high spot of the polyethylene medially, then use that additional poly impactor to hit it in all the rest of the way. We rarely will have an instance where we cannot get the liner in. We can always usually get -- almost always get it in with the combination of those techniques that I just mentioned.

And, Ken, another, you just probably mentioned quickly. There's been a few comments here and questions about the Swedish registry that you mentioned. Can you just briefly expand on that a little bit.

That was recently reported by Malchow, and there was a long-term results with cemented hips and cemented knees reported in the Swedish registry showing those that had cement with antibiotics had a lower over all infection rate than the knees and hips with cement that did not have impregnated antibiotics. They have huge numbers in that Swedish registry, and they were able to show a difference because of the huge numbers that's very difficult to show with limited series here in the United States.

I'm just waiting for the cement to harden. It's almost ready. And so for our closure, when the cement hardens, we're going to let the tourniquet down and then assess the tracking of the patella. It's very rare that you have a maltracking patella when you do a sub vastus approach.

But if I did, I would do an inside-out lateral release and then we'll do our closure by closing that super patella pouch first and then we'll use that with absorbable suture. I drain all knees and then close that lower portion of the medial retinaculum with an absorbable long-term resorbable suture.

And the patient is started in a CPM machine in the recovery room, which I use the first night mainly just to show the patients that the knees are going to bend without a lot of discomfort. Okay. Now my cement is hardened. Okay. So you can see my knee is bending just fine. It's got high flexion. As far as I can basically take the ankle right to the posterior thigh, and with the ultracongruent liner I have stability throughout the entire knee range of motion. The patella is tracking just fine, and I have a knee that's balanced throughout the entire range of motion. Any further questions?

I think we've covered just about everything.

So I thank you everyone who has participated in this. Hopefully you've learned something about a knee that's been very, very successful in my practice with these variations over the last 20 years.

And Tampa General Hospital would like to thank you for tuning in to "OR-Live" with Dr. Gustke and myself. We hope we've shed some light on the Natural Knee Gender Flex system for you. And I've been told an archived version of this event will be available within the hour. Thank you and good night.

Okay.