

**Zimmer introduces the NexGen[®] LPS-Flex
Mobile and LPS-Mobile Bearing Knees
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Hello, my name is Todd Sekundiak. I'm an Assistant Professor at Creighton University Medical Center in Omaha, Nebraska. We're actually here today in Tucson, Arizona at Northwest Hospital and very honored to be with Dr. John Maltry from Tucson Orthopaedics Institute. We're going to be doing an MIS total knee arthroplasty with the Zimmer mobile bearing knee. We invite all of you who have questions or concerns, you can e-mail into us and this is going to be a live, unedited surgery for all of you to kind of witness. I'm going to kind of bring you over to Dr. Maltry and he's going to kind of introduce you a little bit to the patient and the type of deformity that we're seeing here today.

Hello, I'm Dr. John Maltry from the Tucson Orthopaedic Institute. Today we're going to performing a minimally invasive knee arthroplasty utilizing the Zimmer mobile bearing knee. We will start with that in a minute. I would like to introduce you to our anesthesiologist, Dr. Brian Lenius, my assistant, Mr. Denton McGeshey. Christina Marble will be handing us the instruments. And once again, Dave Elling playing bass and clearing up afterwards, I guess.

We'll get started. We've prepped our knee in standard fashion. We have actually already exsanguinated this leg. Load up our tourniquet to 300 millimeters and we're get started.

John, just for the audience, could you tell us if we got any flexion contracture or varus/valgus deformities here?

No, this is an elderly female. The knee is a little -- I would grade it a one plus lax knee but it's basically that in all planes. If she does have some varus deformity it's certainly correctable back to neutral. She has a full and unrestricted range of motion, preoperatively.

Great. I'll simply identify the tubercle here. And I begin my incision actually just medial to the tubercle. In case the patient ever wants to kneel again, they won't have to kneel directly on this scar. So we'll begin it medially. We'll bring it just off the midline. And I'll simply bring that to about the superior pole of the patella at this point.

And there is many recipes for MIS knee surgery as there are surgeons. What's kind of your workhorse approach as we get, you know, into the capsule here?

Absolutely. Of all these approaches, we'll try to do all of our knees that are not too stiff and without a lot of deformity with a subvastus approach here.

Okay. Can you orientate us a little bit -- we know proximal and distal, just a little -- again once you get it started.

Yeah, let me get this done a little bit and then I'll walk you all through this. Not here yet. And I'll simply -- what I'm doing now is I'll put my finger over the top of the vastus here.

So that finger's going over the medial side there.

Over the -- yep the medial side and simply free the muscle from underneath the sub-q here. That will really facilitate me being able to slide that patella from side to side. A little more light here for us. Just sneak in here. And do we got a bovia? I'm simply going to finish taking the last part of these loose adhesions down here so that we can see pretty much all the oblique fibers here of our vastus medialis. I'm simply going to open the capsule then. It's medial to the tubercle, we're going to come just in a peripatellar fashion but we're only going to come to where these vastus fibers begin to insert into the patella. I'm going to make a transverse incision in through the capsule here.

So that clearing, because that margin can be sometimes difficult to identify, do you agree, if you don't kind of --

Normally what I can do then is inset my finger over the top of the actual knee capsule here and underneath though the vastus. So then I can finish freeing up my vastus, leaving my capsule here intact. I'll then make my actual capsular incision right alongside the patellar tendon, though the fat pad, which ultimately I'll remove, and then straight up the midline to come down into the knee joint. The nice thing about that is when we finally repair this, we'll have several non-planar layers to help seal this knee well, as we do that.

This is a very critical point in this exposure, don't you agree, to prevent, you know, essentially bleeding out of the joint in the postoperative phase?

We'd like to not go full thickness here because, once again, I don't want to leave any communicating passages up into that sub-q without at least a two-layer closure if I can help it.

So essentially a facial release. It's kind of at a hockey stick pattern that follows your vastus and then the capsular exposure is a direct vertical.

That's exactly true.

That's over vesting that you're going to close up after, right?

Exactly true. I'm simply going to remove a little more of this capsule here. Be a little push right here.

So I remember even me becoming an old timer now, we used to argue about taking out fat pad. It looks like you're kind of going into it there now. Would you comment on that at all?

You bet. I'm a definitive fat pad waster.

Okay.

It's how I was trained and I do not see problems with loss of blood supply in my patella and I don't seem to see problems with patellar tendon contractions -- contractures after I remove that. So it certainly aids in my being able to see. What I'm doing now is just elevating a flap subperiosteally from the medial aspect of this knee. I'll do some pretty

much every one of our varus knees and I'll just bring it back to that anterior edge of EMCL for now.

Okay.

So instead of showing it to me pretty nicely, I'm going to take out a little bit of this medial meniscus at this point since I can see it.

I think the point here that you're making is you've got to be definitive kind of in your exposures. And each little step does open up the knee for you, would you agree?

Absolutely. Now we got the medial side of this knee released pretty well. The patella is freed up, though I still probably have a little bit more fat pad that we'll end up taking out. But we can begin to see the knee here pretty well.

Yeah, cutting out that fat pad, I can see the whole distal aspect of the femur and even the tibia there, so it's quite nice.

And we'll see that this is pretty well worn out. Just going to slide a little Hohmann over on this side. We'll start to bring this knee up and see what we can get. And this isn't too bad at this point. Once again, I adjust my lights.

So is this exposure your workhorse? Like will you use this for most of your, you know, routine knees or are there people you're going to be scared away from?

No, indeed we'll try this on most knees. I think that true practitioners of the ultra minimally invasive knees will say that I've got this knee pretty wide open. And I don't hesitate at all to extend my skin incisions here and simply make this a little wider exposure if, in fact, I'm struggling at all. I don't believe that the skin here really contributes to anything with respect to short or long term rehabilitation. So I certainly recommend and practice we are not going to struggle here solely to have small skin incisions.

So is that a tension thing that you'll kind of look just at the corners of our incision like the distal proximal extent, and if it's really being tugged you'll start extending it?

Exactly correct. Exactly correct. In fact, have you got a knife blade? We're going to add a little it up here on the top. Let's relax that for one second. Because when these corners start to not look like sharp corners any more and start to get nice and round like that, I think the skin is getting stretched a little more than I'd like it to be. So we'll simply give ourselves a little bit more. And you can see how just a little bit aids in Denton's ability to show me this knee.

Yes, it's amazing, a centimeter extension and the whole visualization changes.

You bet. Now what we initially will always try to do -- and this is simply personal preference -- is I'd like to cut the tibia first. Certainly you may cut the femur first if you choose but if we can -- let's have a pointy Hohmann please -- if I can begin to deliver this tubularly at all, there we are, then I won't hesitate to try to cut my tibia first. With that, you can see that we can see this remarkably well and can probably get started here. I'm actually going to change this one more time.

I guess for some of us who are not mobile bearing users, why would you elect to do a mobile bearing in this lady?

Actually the mobile bearing knee is my workhorse now in the fact that it's a knee that's just as easily accomplished to do technically as any of the other knees, I believe. It places a premium on getting the knees well balanced, which I think we should be doing anyhow for all of our cases. And I'm finding -- not scientifically yet -- but I'm finding that we seem to get easier and more overall flexion in our knees. Do you have a tibial cutter.

Are there any other potential benefits that you see with it?

Well, I think that the knee has indeed improved in its design. The pivot point of the mobile bearing in this knee is indeed right up anteriorly much more anatomically at the insertion of the ACL. And with that, I think when the knee flexes that it doesn't drive the tibia forward so much and doesn't give us some of the patella femoral dysfunction that we're reading about with some of the other mobile designs. So I've been so far very pleased with the overall function and our final results. And I suspect those nice design changes have something to do with that. What I'm doing now is getting set up to cut my tibia. I'd like to place my tibial guide essentially parallel to the tibia. And I have a cutting guide that's going to cut approximately 7 degrees of slope from front to back into this -- into this tibia. Some of the other systems cut at zero. This system cuts at 7 and I like that because the natural native slope here on the tibia is typically found to be between 5 and 9 degrees.

So as a guy who's been doing fixed bearing, you know every time we change something we introduced more complications. For you kind of switching from a fixed bearing to a mobile bearing, what do you have to do in your technique?

That's one of the beauties, I think, of this -- taking off a few osteophytes here, see that inch wing back -- is that really we haven't had to do much at all. The overall design of this knee hasn't been changed from previous fixed bearing designs. It's a high flexion system that in its fixed bearing has had nice results and now in the mobile bearing seems to be doing even better.

So essentially no change in your technique going from fixed to mobile?

No, no real change. And once again, if there's any change that makes us concentrate and focus on ligament balancing a little more than we had to perhaps in the past.

I'm kind of glad you made that point because a lot of people think that mobile bearing are less forgiving type knees and any time you introduce more mobility and more flexion, it's from my perspective, that they're probably less forgiving. Would you agree with that?

I think so. I think that once again, any of the knees that we're doing, if we get constant reminders about the fundamentals of trying to get our flexion and extension gaps well balanced as well as our collateral ligaments well balanced, that almost any knee will work. But if we'll maximize and think about those things and then take advantage of these nice new mobile designs I think we find ourselves in situations where we really can maximize the benefits of these new knees. But even if the designs are wonderful, if we put these knees in poorly, we still will end up with our standard instability and/or rapid aware problems. Heavy hookup, please.

Good point. Just make sure you do it well, no matter what you're electing to do, right.

Here a little more. Let me see the saw back, please. Many times we'll try to not make this tibial cut all the way back before I get the piece removed. And then we can easily clean up

here in the back when I can see and don't have any danger of plunging posteriorly. You even have a little more meniscus left here.

I guess we haven't talked too much about the design of this implant. It is a high flexion implant and is it posterior stabilized or cruciate retaining?

The knee we're using today is a posterior stabilized design. And as we move forward here and begin to bring the tibial components up onto the field, we'll show some of the changes in the post and cam design which allow this knee to work well in high flexion without the threat of the post jumping. Okay, now we'll simply take a size here. I got a lot of osteophytes here and I'll try to start to clean all this off.

So again, this is where people have always said, you know, because of the mobile bearing component we can be a little less stringent on our rotation of our tibial component. Do you agree with that or should we-

Well, certainly the -- let's have a pin -- I like this size 4 actually. And what I will do is tell you that we'll maximize the ability of this prosthesis to rotate if we optimize the position of the tibial component, the same way you would do in a fixed bearing component. If I can have this knee in the end with the mobile bearing in rest with the bearing at its central point, allowing its full rotation into both internal and external rotation, I don't have to worry about the bearing hitting the stops and perhaps causing problems that direction.

So still not an excuse for sloppy technique.

Exactly true. What we're simply doing here is I've got a trail on but I've attached this alignment handle, put alignment post on here to check my cut. And I am pleased with that cut. We seem to have a nice perpendicular access.

And your landmark's down at the ankle? I always get that question whether you look at toes or do you look at malleoli?

I feel malleoli but I know that with fibula over here that I need to move my aiming point down between the first and second metatarsal, which is where I try to aim for here.

Okay.

I think we can also see, if I step back here, here's our trial tibial component in place that we're going to use to drill and punch for but it, indeed, is the exact same shape as our final. It has a central point marked on it. And where I like to see that central point come, with respect to rotation of this, is down the medial third of my tibial tubercle to approximately here, so we've got that in the right spot, which should lead to good reasonable placement of our tibial component and not have excessive rotation problems. If our tibial components tend to get very internally rotated, which is a problem with minimally invasive approaches, if you tend to get pushed around by the patellar tendon, we then can end up with severe patellar tracking problems. We're just simply drilling for this keel of what ultimately will be a cemented tibial component.

So what about the mobile bearing mechanism? Do you think it's an issue of producing more wear, more problems, or is it a safe mechanism?

Well, I think it's -- you know other companies have proven that the mobile bearing concept can work well. And we can end up with conflicts that work nicely and have very nice long

lives. So I think the mobile construct, in and of itself, is a good one. And then I think we've simply been struggling to make sure that we don't end up with patellofemoral problems -- let's have a hammer please -- and I think a lot of that has to do with trying to decide ultimately on the size, shape and position of our cam and post mechanism in these posterior stabilized units. Let's have a pin puller please. All right, nice job. At this point we'll simply move up and begin to work on our femur. Yep, this is going to be -- we're going to guide this with in an intramedullary system. And once again, through templating we know that our starting hole, we summon medial.

And how much flexion are you making our distal cut in?

We're going to try to put our femoric -- put into slight flexural. We'll use the three to recutting block here. And I like to cut my femurs in 4 degrees of valgus. And that certainly is personal preference.

And is that gender-specific or is that for all comers?

No, I tend to do that in all comers. The only time when I tend to cut less valgus into these is when we have people who are quite heavy who tend to walk with their legs farther apart anyhow and introduce a whole lot of their own valgus into the knee. And I feel that those, if you set them in slightly less valgus, will tend to end up with a more parallel joint line with the floor and hopefully a longer-lived prosthesis.

And I assume you're just taking 10 millimeters off because you didn't have any severe deformity.

Yes we are. This guide is set up to take 10 millimeters off our least effective side. So we're set at 4 degrees here. Okay. Saw it backed up very nice. So we'll pop these off for a moment here. See our saw back, make sure that our cuts are equitable here. Sometimes this saw likes to skive off of this very hard bone that tends to be up here in the intercondyl notch region.

Credit you on your exposure, if you look in there, is it just two retractors in there for the whole exposure? How are you keeping your patella over in the lateral gutter?

It's -- well we move these over until when we tend to flex the knee, generally the eccentric mechanism sort of pulls it around back in the corner here and it really isn't much of a problem.

Not much tension on the soft tissues from what we see.

Okay, do we have sizing end? This is still a rather old sizing guide that Zimmer produces. There is indeed another that this boom section is modular. Today generally we can get away with this, but that modular one is quite nice in the fact that we can insert our feet underneath the condyles and then simply attach the boom and slide it underneath the extensor mechanism. Today this one's working pretty nicely.

Is that for the guys or gals with like big quads where you kind of -- it's hard to tolean [sp] under there? Is that when you need that other one?

Yeah, some people -- this gal has a, quite honestly, a very light quadriceps mechanism here and it's very easy to manipulate this. Some of the larger men especially the vastus muscle

is enormous and very difficult to try to mobilize that out of the way. And the feeler that then is simply modular that tucks underneath really works nicely. Okay, go ahead and drill her.

And how much are you rotating there?

This rotates 3 degrees externally with respect to those condyles. Now what I've done here is I've drilled holes in that 3 degree area and I'm measuring in between a size D and an E here. And with this system where I remove the posterior cruciate ligament, I generally will tend to size up, as opposed to size down, which many do with cruciate retaining type designs. So the other thing we can do here is, with the pins in place, I can begin to make sure, if I can feel my epicondylar access, that my pins are external rotated approximately that same 3 degrees to that epicondylar access. White size line we can also use here, but due to the severe patellofemoral wear, a little more difficult to identify. Let's see an E block. Is it a four-in-one high flex cutting blocks from Zimmer. The yellow blocks here are high flex blocks. There's also ones that will cut for the standard knee that are still steel colored. This tends work, tends to fit nicely. Let's screw this into position.

And going up with the size in females, have you had a problem with the actual fit in the ML plane with these components?

Sometimes yes. The female knees indeed tend, for each size, to be a little taller and narrower than the male knee. Dr. Mafoos I believe at the University of Missouri proved that point. And with some of the other knee systems, indeed, there are gender-specific femoral components that can be used. With the rotating knee system, a class III device at this point, with respect to the FDA, this is not an on-label usage to use the gender-specific femurs with this knee specifically. Well, I don't think we'll have to anyhow today. This standard block tends to fit very well. Now with this, an all knees, I tell you when you come over to cut the medial side here, really a good idea to tuck a thin Hohmann type retractor between the condyle and the medial collateral ligament here. This is a common time when this ligament can get inadvertently injured or cut by your saw.

And I know a lot of surgeons are paranoid of notching also anteriorly. Is that kind of why you use that 3 degrees of flexion and do you have any other pearls for us to kind of avoid that?

Certainly that does help because it tends to then make that dorsal cut angle upwards. And when we use that feeler gauge to guide our dorsal cut here, it's important not to put that feeler gauge in the very lowest fossa of the dorsal femur here. I tend to put it up laterally on the lateral ridge, which also helps me not notch. And if I need to recut that, I certainly can. Okay, let's remove this. Got an osteotome? Then I'll simply finish my cut with a small osteotome. Pieces here, you got a pickup?

Now here you've kind of committed to your cuts already.

Indeed.

Are there times when you won't make all your chamfer cuts and kind of just, you know, kind of prematurely kind of do your flexion extension gap balancing before you kind of complete all your cuts, or what's made you kind of feel comfortable in doing it this way?

I certainly will not do that and will come back if I have a knee that's significantly abnormal. And the knees that tend -- that I tend to be very careful on and come back and measure it - - let's see a pickup for one second -- measure flexion extension gaps, multiply throughout

are the -- typically the rheumatoid knee that presents with a significant flesh contracture and a significant valgus alignment. Let's have a notch-cutter. Typically these knees, the standard varus knee without significant deformity, will require some releasing medially -- and screw that down then -- some releasing medially. I've already partially done that with my initial exposure. And then we'll fine-tune that with our trial components in place.

And when have you committed to the medial lateral position of your component? Was that with your gold block or are you doing it here now?

No, with our notch block now I'll need to cut a box to accommodate our post in this posterior stabilized knee. The guide that I've got on now is going to determine where that notch goes. And that indeed will fix my final ML: position. If I'm in between sizes, I'll always tend to bring that prosthesis laterally, as opposed to medially, to help my patellar tracking.

And does this block correlate to the actual ML: diameter of the component?

It does.

Okay, so you're using that.

I'm using these wings-

To kind of correlate to the size.

To correlate, yes sir. We'll simply drill our lug holes -- small saw -- put your right in there, it's nice.

Now for people not familiar with the Zimmer system, what's this last cut that you're doing there?

I'm simply creating the little patellar recess cut that will allow for my trochlea to fully seat. Let's take these out. I'll finish that little trochlear recess cut with an osteotome here and remove that very small piece of bone that remains here. Okay at this point -- got a pointy Hohmann -- I'll now put just a Hohmann -- some people use a laminis spreader here and I'll just gently elevate. And I want to make sure that I've done a good job in removing my meniscal remnants and I'm going to go back and feel and see if I've got any posterior osteophytes on the femur, which I'll need to clean out in order to achieve maximum flexion. I generally can feel back here for these osteophytes and indeed, she does not have any back here to speak of. But if I do find something back here -- if you've got a 3/4 inch cured osteotome -- it's relatively simple business to come back in and remove these osteophytes. Or if people have significant flesh contractures to come back and release the posterior capsule or at least peel the sucked down capsule back to its origin. Femoral component.

Now your using a high fl component, is that correct?

Yes.

So has that taken a little more off the back side of the femur? Have you found that to be a difference in osteophyte removal?

It does. It facilitates osteofibroma because I believe remove 3 extra millimeters -- 2 extra millimeters from the posterior condyles to allow for the prosthesis, which as a much longer radius in the posterior condyles to allow for our increased flexion.

And has here EEOB even a detriment with taking off that extra 2 millimeters?

I don't believe so. I don't believe so.

So even your small patients, they can still accommodate a 12 millimeter posterior femoral resection, is that correct?

Indeed. What we're simply done is -- do you have like a size 5 base plate? Our trial base plates correspond to the original sizing guide that we used in each one of the sizes here and contain simply a central pivot post. And that's the unique thing about this. That post has now been moved anteriorly to allow the center rotation of the femur on the tibia here to be moved into a much more anatomic position. This prosthesis has a stop in front of it which will allow approximately 25 degrees of full rotation before it hits these stops, allowing the knee, if we'll place the tibia critically to fully have a full range of motion for rotation and allow for screw home and increase flexion without causing impingement and without causing the femoral condyles to ride back onto the back corners of your poly which will be so commonly seen as wear pattern in fixed-bearing knees.

And so why do we need a stop?

I think the stop is a good idea. We've seen in some of the hinged type knees even, with a fully rotating polyethylene that if we do indeed have poor balancing of our ligaments or if we have a loss of a ligament, stretching one, that the tibia could actually rotate and dislocate, if you would, and cause problems that direction. This, at least, will not allow that, but effectively if were poorly rotated and the tibia rotates all the way around to the stop it effectively becomes a fixed-bearing at that point. Here we are with our initial trials in place. And we can see that allowing this polyethylene to simply rotate into the position it desires, that we're pretty well centered here with respect to our tibial base plate. If, once we're done balancing our ligaments and we move the knee through a full range of motion, we find that we need to rotate the tibial base plate just a bit to allow maximum internal and external rotation without hitting the stops, we can adjust for that at this point and then carefully mark.

So we'll move the knee through a full range of motion and make sure it's kind of in that central range of rotation, is that what you're telling us?

Absolutely and as we look for motion, I would caution we need to move the patella back on top of the knee into its native position. If we leave it subluxed here laterally, we tend to very artificially tighten this lateral side and it will lend us to believe that perhaps our ligament balance is different than it actually is. So initially with this in place we certainly can achieve this lady's full flexion to the absolute maximum amount that her soft issues will allow, certainly greater than 140 degrees. Okay, she comes back out without influence her to nice full extension. And looking at her medial lateral balance, it's excellent but it's a little too loose. If we remember, this lady had significant loss of bone on her tibia. We end up then cutting the tibia a little lower, so we're going to ask for a 12-millimeter polyethylene to get this done. This femoral component, it goes along with this, fits very well in this patient and gives us very nice coverage throughout and even up under the trochlea. We've got some little bone spikes here that we'd like to get rid of.

Looks great.

While they're working on that, we'll move on to the patella. And at this point, things are generally pretty nice and loose. We can rather easily and without much trauma evert the patella. I tend to use two towel clips, one superior and inferiorly, to try to get control, bony control of that patella. We'll then measure the overall thickness that we begin with. We'll find that to be about 22 millimeters. And we're also note that this lady has lost a lot of patellar bone. So I'm going to make my patellar cut free-hand. Certainly there's a lot of different -- there are a lot of different patellar guides that can be used, and I think none of them are any better than simply looking at the anatomy from the tendon to the tendon and gauging accordingly.

How much resection are you looking at here?

Excuse me?

How much resection are you looking at here?

What it'd ultimately like to do is restore my native patellar height. The prosthesis that I'm going to use is 10 millimeters in overall thickness. And so I'd like to make a 10-millimeter resection but, considering that I'd like to leave at least 12 to 13 millimeters of native patellar bone so that I don't have problems with losing my blood supply of this patella. So this lady measured 22 but I'm not going to worry if I leave her a 24 or so because that's probably where she started before she wore away a significant part of the patella that she had. See a 32 to start.

You must get good pricing here or something.

So far I haven't been thrown out of the hospital yet, so I think we're good to go. We're doing all right with that.

That's good.

And we'll simply now remove our trials. Can I get the femoral extractor?

Putting antibiotics in your cement?

For primaries, no I do not. On all of our revision surgeries, that is our standard. But for our primaries, we tend to rely on our prophylactic, pre-operative prophylactic antibiotic regimen, which includes for us Vancomycin and Cefazidime in single one-gram doses. Let's have a pickups, we have a little remnant of bone here. That's not really in, is it. Very good. All right, let's wash.

And you cement all at once or stagger it?

With this, I do cement all at once. We're using Simplex cement today, which tends to be a rather runny cement that has a very long working time.

One of the biggest concerns with MIS is retained cement and any pearls to help guys get cement out of the back of the knee when they're kind of tight?

Well, we'll try to be pretty careful -- pickup -- pretty careful as we put on our tibial component. We'll emphasize cementing the tibial keel and then keep our cement mantle underneath the plateaus at a minimum so that we have less cement to deal with as we're beginning to clean up here. Okay, we got a -- have you got a tonsil? Ah, so.

We kind of didn't talk about how you would not use a mobile bearing on or maybe I was sleeping through it, but are there some patients that you're kind of scared to use the mobile bearing on?

Absolutely. Once again, those patients that have significant deformity or instability. Obviously, if we have an incompetent medial or lateral collateral ligament, this is not a knee. We're going to require significantly more constraint for that type of knee. And also knees that have very significant deformities, we might be able to correct those deformities and use this type of knee, however I'm always nervous when we're trying to correct those deformities that we will then cause enough instability that will require a knee that has some more constraint. So those would be the general two cases that I would definitely not immediately consider -- there we go right here.

Now if you're uncertain, can you make that decision interoperatively?

Certainly. The cuts are identical. The cuts for these knees are identical. The only time we've committed to this prosthesis is right now when we've finally cemented in this base plate.

You talked about the importance of reducing your extensor mechanism when you're balancing your gaps, what about the people that have some type of extensor mechanism dysfunction, whether it's a patellectomy or things like that? Would you veer away from those or do you have any fears?

I'm not sure that this knee would perform any poorer than a fixed-bearing knee in a knee that had had a previous patellectomy. But I think people with significant extensor mechanism problems are indeed the knees that we need to be very careful with as we consider any type of knee arthroplasties because certainly extensor mechanism failure in a knee arthroplasty is a very difficult situation to remedy and recover from. At this point, being that we have already decided on a final poly, we had utilizing the 10-millimeter polyethylene that we trailed with, we were just a little loose so we decided to go up to a 12 and that will certainly be enough to take care of our issues. At this point what we like to do is insert the final polyethylene in this before we put on the femoral component. I find at this point that that is quite easy to do and we're not doing anything that might damage the undersurface of this polyethylene, which is very critical that it stays smooth to articulate in rotation with the smooth polished tibial component.

Okay, but now I'm getting scared because how am I going to clear that post now to get my femur on there?

I shall show you this.

Okay, you'll make me feel much better.

Almost always at this point, the femoral component is sitting behind the tibia here. And what we'll do is apply our cement to the distal portion of the femur here and the dorsal portion. I'm going to have Christian place cement on the posterior condyles already in the prosthesis. I'm simply going to set this prosthesis in, engage the cam and the post, and just let that rest down on the polyethylene. At this point, we use a long, heavy type of Holman type retractor which we'll place on top of the post and underneath a nice strong posterior aspect of the innercondylar notch, but I'll simply elevate my femur gently to let my condyles come around and get in position and then simply tap my femur into place.

Great little trick.

Final seating with an impactor. I think generally that can be done with, in a very nice controlled fashion, with very little trauma to the polyethylene. The other way to put the polyethylene in is to place both femoral and tibial components and then place the polyethylene -- do we do have a trial of any of the polys? Good -- piece of bone. Just actually with both components in place, place the polyethylene actually in final position on the femur and then rotate the tibia up into position and have the -- and carry the post, the trunion if you will, of the tibia up in until it engages here. I'm a little nervous about that in the fact that I'm worried that that post might injure the undersurface of the polyethylene. And that's why we've developed this technique.

I think your technique is also very helpful in the obese patient because sometimes that thigh/calf index can play games. Have you found where you can't clear your femur?

Oh, I think so. I have tried to put my poly in the other way and have struggled at times. So here we have our final construct in place -- we'll put the patella in in a moment here -- final construct in place with our 12-millimeter polyethylene. Our rotation looks excellent. The poly is approximately at midpoint. Our motion's excellent. Our balance shows approximately a millimeter of balance with good balance on both sides. And then we'll check for patellar tracking. And one of the nice things about these approaches that leave the entire extensor mechanism intact is that without touching the patella, virtually always they'll find a nice normal track down the center of the trochlea without necessitating any type of lateral release, which we tended to do incredibly frequently in the days when we did a lot of tendon splitting and quadriceps splitting operations.

So if you had a little bit of tilt there, what would be your next step? What would you do?

Well, I'd need to make sure, and I tried to do that earlier, that my patella is cut on a planar basis and I don't have a lot of tilt. But still if my patella was tight laterally, I would not hesitate to do a lateral release to get that to track appropriately. At this point then we'll place a drain.

And sometimes here, do you find you can still have that little bit of a tight patelofemoral ligament or would you have released that by now?

At times. Typically I'll release that for the inside here and as the initial portion of a lateral release. I'm going to place two drains in this case today because I have, one, I want to drain the joint itself, but after I close that joint then I'm going to place a second drain on top of the vastus here where hematoma could collect that I don't want. See a scissors?

I think that is critical with this exposure, don't you agree? And maybe you can go over the closure of those two layers that we talked about at the beginning of the case.

Ultimately now, once we irrigate -- pickup -- what we'll do is that here's this medial capsular flap that we'll simply repair. But prior to that we still have our entire intact synovial flap, which we can tuck up underneath and end up with ultimately a nice two-layer closure. We'll release this a little bit. So now we're irrigate and just do a standard closure. And that will be our operation.

That's a great job.

Thank you all for coming.

Thank you.

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