Anterior Approach to Total Hip Replacement

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Good afternoon, and welcome. My name is Tanya Ferguson. I’m a surgeon at U.C. Davis Medical Center. I’m here in Santa Monica, California today with Dr. Joel Madda at St. John’s Hospital. Dr. Madda is going to take us through an anterior approach total hip replacement. Now this was done about four or five years ago, we did a live broadcast of a more straightforward case. Dr. Madda has chosen a patient who’s got some more more difficult challenges to get over today.

So I think--I’ve been working on the anterior approach for about seven years now. I did Dr. Madda’s fellowship 2004/2005 and have been using this as my primary approach to total hip replacement since that time. I think we’re ready now to go live to the operating room with Dr. Madda. Dr. Madda, are you there?

Yeah, I’m here, Tanya, and we’re just finishing with draping on our patient. So I’ve been doing anterior approach surgery now since 1995, and so I’ve got 15 years experience. I’ve done about 2,800 primaries. This is--could you go to the jib camera, boom camera, overhead camera? Go to the overhead camera, there we go. Okay, give us a bigger picture, zoom out.

Okay, so we’re just finishing putting on--have the patient on the hana table, the OSI hana table, and this is made particularly to facilitate anterior approach hip replacement. We’re putting on the bracket that’s going to hold the hook lift device, so I made a hole in the drapes, paper drapes for putting it over the posts for that, then I’m going to put a vinyl drape over that. But as we were talking--

So what you’re doing right now is putting some ioband over the top of that post to keep it sterile, is that right, Dr. Madda?

Correct, yeah. So it was a sterile piece, this piece that I put through a hole in the drapes, but of course it’s a non-sterile area on the other sides of the drapes. So why don’t you zoom in a little bit with the jib camera. Now I’m going to take off these gloves that I was using for draping. I do that routinely, and I’ll put on the surgical gloves. Why are we using these? Oh I see, okay. So we have some of the sought-after old green gloves that we can’t get anymore. Why don’t we go to the hand-held camera now, and Stephanie’s going to have to shoot across you here, and we’ll start talking about them in front of the x-ray board.

Anyway, just a couple background things. I’ve done now about 2,800 primary anterior approach hip replacements, and that’s a consecutive unselected series. So I’ve done everybody since 1996, November ‘96, with an anterior approach, and that’s using the orthopedic table. So it’s one of the, I think, key advantages of using the orthopedic table is we don’t have to be patient selective, and it’s going to help a lot for the exposure of both the (inaudible) and femur. It’s going to help with our assessment of leg length with facilitating the radiographic controls, it’s going to help with cup position, and allows us to get the procedure done with minimizing soft tissue trauma, minimizing retractor pressure. Because the table helps in delivering the bone.

So if we talk about difficult cases, and I had a request to try to do a more difficult case, and probably a lot of the people tuning in today have seen live surgeries, and they’ve got this skinny little patient with a minimal incision. This man is 6’5”, 260 pounds. This is usually the most difficult type case for hip
replacement is it’s usually a male that’s—it’s a big, muscular male, it’s a more difficult one, and that’s usually more difficult than, for instance, a fat patient that may have a big pannis hanging down you can tape out of the way. But usually, if they aren’t so muscular, and you can push the fatty tissue out of the way, it isn’t as difficult as the more muscular, larger male patients.

Now, we’re going to look at the x-rays. The other reason we chose this case is I wanted to talk about special anatomic problems, and can you zoom in on the lower left AP pelvis here? So you can see he’s had a previous hip arthroplasty on the left side. This was done about five years ago. It’s functioning well, except that he tells me he’s too long. And if you look at the--I need some gloves over these, please.

So I’m going to put over some gloves over my surgical gloves, so I can get a little bit closer to the x-ray, and point some things out to you as we do this. So first of all, if we just used an x-ray of the straight edge here to look roughly at the leg length, looking at the two lesser trochanters, he says he’s about—he thinks he’s about a half inch too long, and I think that’s a pretty good assessment. He’s probably a little bit over a centimeter too long. Could you hand me a tonsil clamp, please?

So on his left side, his previously operated hip, he’s been made too long from his natural length.

Yeah, right, and my premise is on this is a posterior approach destabilizes the hip, by cutting the external rotators, cutting the capsule, and then the surgeon tries to make up for the lack of stability by altering the anatomy, and one of the things is doing this shuck test, trying to feel the soft tissue tension, and they keep tightening the thing up so they think it’s tight enough that it’s not going to dislocate. What’s the result? The leg’s too long. I see this again and again. Too much length, too much offset, and he also has too much offset, you can see the femur is further from the pelvis here than it is on the native side. And then the cup, the other thing that happens I think with posterior approach, again, fear of dislocation. The surgeon keeps pushing up the cup size, try to get in that biggest ball possible, and now you’ve got a cup sticking out, outside the edge of the pelvis. So you have possibility of impingement between the femur and the copper, just things like (inaudible) tendon impingement. You want to have the cup contained within the atsttabum.

Another thing you can see on this case here is this cup is extremely anoverted, and when the ellipse here is at about a 45 degree angle, and very anoverted, this cup is also very vertical. So you get a high edge loading, and you get a potential for quite a bit of polyethylene wear.

So I think with anterior approach, first of all we can avoid some problems like this leg that’s too long, cup that’s oversized, cup where you have—we’re going to be able to know the position, put it in an ideal position without too much anoversion, too much retroversion.

And now you’ve got a patient who is--is made longer than he would otherwise be. As the surgeon going into this, do you plan to lengthen his other side to that same length, or is your intention to match his normal anatomy?

Yeah, that’s a good question, thanks Tanya. And so we’re going to start out--normally what I’ll do is I’ll compare the side we’re operating with the other side during surgery, but the other side is something we don’t want normally. So we’re going to start out--we’re going to save an image on the fluoroscope of this right hip, and we’re going to lengthen this beyond the current length. Now of course a patient comes in, they say I’m too long over here on this left side, can you make me the same length?

It’s a tough thing to know how much to lengthen him, and I’ve found if you actually lengthen the anterior approach side as much as they’ve been lengthened on the posterior approach side, they may feel too long on your anterior approach side. We want the patient to feel equal when the surgery’s over, so we’re going to lengthen him probably 2/3 to ¾ the amount that he’s been lengthened on the other side, and we’ll be able to see that in surgery, how far we’re lengthening.

We still may leave him a little bit shorter over here, in order to anticipate that he’s going to feel equal after surgery, and I think the effect is that when you split the iliotibial band, you essentially create a soft tissue
release that allows the trochanter to go lateral, to lengthen a little bit more comfortably. But with the anterior approach, we maximally preserve the lateral soft tissues. We don’t touch the abductors, we preserve the iliotibial band.

So if we lengthen this too much, it’s going to tighten up the hip and create an abduction contracture; he’s going to feel too long. So there’s actually no exact formula to say how much to lengthen him, to make him feel correct when you have the situation where the other side’s been done too long, but we will make him longer, because right now, he feels like he’s about half inch—he even said 12 millimeters too short on this side.

No if we go on to the astabular component, it’s interesting on this guy, too, he has actually what appears to be a little bit of a dysplastic—can you zoom in here on this side? He has—zoom in more, keep zooming in. See, he has a little bit of a dysplastic astabulum, you see, and with that he has a big radius of curvature. He’s got a big femoral head with a big radius of curvature, but the astabulum’s relatively shallow. You see, part of the femoral head here is outside the joint. So when you template the astabulum, if we try to match the radius of curvature to his radius of curvature, we’re going to get about a 58 or 60 cup. But the problem is, we’re going to end up with a cup that’s like this, that sticks outside the bone, you see?

So with an astabulum that’s a little dysplastic, you have to think smaller than the native radius of curvature. So I’m thinking more like going down to maybe 54. So this is one that’s not going to be—the radius of curvature doesn’t quite match his radius of curvature, but we’re going to ream into the central part of this broad radius of curvature cup, to get a cup to fit inside his astabulum.

I think that’s also—what you just said, it’s something that I run into a lot with my more dysplastic patients with a high riding femur, for example, and the use of the anterior approach that you can use the x-rays to help you really place your cup appropriately, or where you as a surgeon really want it.

Yeah, so that’s what—I think what the—some surgeons get it backwards, and they think when they have a dysplastic hip, they’re going to put in a big cup. You’ve got to think about small cup, and he doesn’t have a true dysplasia, of course, but there’s a little variation here that you don’t—we have to put in a cup that’s a little bit smaller than the native radius of curvature.

Okay, so we’re going to go back to the—could you go around behind the table there and we’ll just show we have the patient a little bit broader view. zoom out. Big zoom out view in the handheld camera, please. There we go. So we’re—now when the patient’s on the hana table, we’ve just prepped and draped the hip area, just a rectangle. So a lot of people think it’s going to be a more laborious, more difficult setup on the hana table. It’s actually easier, because you put the patient supine, you don’t have to put him lateral with these hip grips and stuff, and you just attach the boots, attach the feet to the table, then all we have to do is prep and drape a rectangle here.

So you’re not yelling for the leg holder to come down the hall, and a guy has to hold the leg, then you have to hold the leg while you prep and drape it free. We just prep the rectangle here. So why don’t we go back to the jib camera, please.

And Joel, if I could just ask you, you said in your introduction that this is a large, muscular man weighing 260 pounds. If this was a patient that was also fat but with a big pannis, you mention you might just tape that pannis out of the way. Would we be looking at something similar if that was the case? If you taped a pannis out of the way, would you still end up with a surgical field that looks like you’re looking at right now?

Pretty much. Yeah, I mean a lot of times, just—you push the belly out of the way. This way you can tape it back, and even without going to that extreme, if you just push the pannis upward, and then you drape, starting the concavity with the adhesive 3M drape, and drape outwards in both direction, it’ll kind of hold things open like this.
So even the--the only thing you have to be careful is if they have a skin fold through here, and they have like a very inflamed area, particularly a skin fungal infection, a chronic infection. You can’t operate here. You don’t want to get near that, you could have an infection.

Okay, so now we’re going to look at the iliac crest, the solan mark I use, and then I’m going to palpate the femur, it’s down here, and yeah, you can see that.

So Joel, that’s the lateral border of the femur that you’re feeling, up the greater trochanter and then coming down?

Greater trochanter, I’m putting my fingers on it. This is about the top of the greater trochanter, this is the anterior border, the femur, and I don’t think you can quite picture it there, but the tensor fasulatum muscle has kind of a bulge right here that sticks out, and we cut over the tensor. So this approach doesn’t really go--the deep approach is medial to the tensor, but the skin incision is over the tensor and we’ll start about three centimeters lateral to the anterior (inaudible) spine, a centimeter distal, and almost in every case I’ll begin with this, see how we do, but essentially in every case I use about a ten centimeter incision for males and a nine centimeter for females.

And that’s not something set in stone. You can be the small incision king and you can make incisions smaller. Or you can make it bigger, and particularly when you start, you want to make the incision a little bit bigger. But the line I’ve drawn here is kind of a guideline.

Joel, this line that you’ve drawn is somewhat different than the line that we used to use when I was your fellow. Your incision seems to be more lateral than I remember it and be oriented posteriorly at an angle much more so than I remember it.

I think it’s gotten a little more oblique, but it should find the line of the tensor. But one of the rules we followed when you were a fellow, and we still follow, is never cut on the line, right?

Never cut on the line that the fellow draws, that’s for sure.

Sometimes I cut on the line, but very often I just kind of draw it as the guideline, and then I’m not going to cut on the line.

Yeah, but you’re cutting more lateral. So tell me if I’m wrong here, but one of the more common mistakes people make in starting this surgery is making that incision too medial.

Right, I think so. I think there’s more mistakes made by going too medial than too lateral. If you go too lateral, you can split the iliotibial band, but it’s not--it puts you in a different interval. Then you go in the Watson Jones interval. It’s not a disaster, it’s a whole different approach. But--okay, we’ll get a few bleeders here.

One of the things we weren’t able to see, because we didn’t see how the patient was positioned, was that you internally rotated this extremity a little bit at the beginning of the very positioning of the patient, to accentuate that tensor bulge, is that right?

Yeah, it accentuates the tensor bulge, and also, we’re going to take an x-ray on this side, too, before we get too far along, and I want to have--

And that’s something that you don’t always do, Joel, is that correct? You don’t necessarily start by taking an x-ray of the side that you’re starting with. You’re doing that because the other side has been operated previously.

That’s correct. That’s correct, yeah. So if there’s some reason that the other side is not going to be a good radiographic reference--
For you to use later as you template your length, or use your overlay technique to get your leg length and your offset--

Right. One thing is, you know, we're actually going to use the other side, in this case, to help with length, because we are lengthening them, and we want to know we're getting close in length. But like I say, we'll probably leave him a little bit shorter on this side. The x-ray will show it a little bit shorter.

Yeah, you know, that's a really important point. I think a lot of people that have started with the anterior approach think about it as a way to preserve the “short external rotators,” but the preservation of the iliotibial band and the abductors really has important consequences if you increase the length and the offset, and/or the offset.

Yeah, so with the anterior approach, I mean, like you said, the soft tissue aspects are kind of what got me to it, to have the--because with the old argument, I don't do lateral approach or anterior lateral approach because a lymph, and I don't do posterior approach because they dislocate the anterior approach, doesn't have either disadvantage. But the other big advantage we're getting from anterior approach is we're getting more accurate cup placement, plus more accurate control of leg length, plus offset. And so as we--we're probably going to lengthen this man, we're going to lengthen him on this side. We don't really want to change the offset, though, the femoral offset, because that's the lever arm his hip works on.

So what you just did now is you went through the patient's skin and subcutaneous fat, and then you came down to this glistening fascial layer there, it looks like.

Yeah, could we have a hibs, please? And let me know if my head's getting in the way here.

Oh I promise, I'll tell you.

Okay, so now we--I would say bring the camera toward me a little bit, the camera toward me a little bit. Okay, good. Now angle it away from me a little bit to recenter it. Okay, it'll make it a little harder for me to keep my head out of the way, but we'll get a little better view.

Maybe zoom out just a little bit. There you go.

Okay, now here's the (inaudible) overlying the tensor, and we can see the muscle through the fascia. Okay, Alice, clamp. Yeah, why don't we do that. So I'm going to go inside the fascia to go around here, but Dr. Retchall on my team here reminded me we should get an x-ray of the other side. So while we're getting ready to get the x-ray, I can just--maybe you can get the hand-held camera, just introduce it. What? Team here, this is Dr. Hamid Retchall, he's my fellow, and Stephanie is our scrub tech. Marylane is a physician assistant with me today. Danielle is (inaudible) Tina (inaudible). We have Dr. Weber, anesthesiologist. So (inaudible) is her x-ray tech.

So probably it's the normal team. I have two assistants very frequently, but one assistant works very well with this procedure also. Okay, let's bring in the image.

And Dr. Madda, did you introduce who was going to be circulating and running your table?

We have Tina, and also Brenda's here, the two RNs, so we're kind of heavy staffed to make sure this thing goes. We're more staffed than we need here.

But you really need somebody that can run that table when you do this operation.

Yeah. Raise the table please, Teri, a little more. Good, x-ray. Okay, so first thing I'll check in and out toward me a little bit, Sheila. X-ray. We're going to check to see that toward you, x-ray, we're going to check to see toward you just a little more.

Maybe we could get--oh there we go, thank you.
Rotate it a little clockwise, clockwise. Okay, we're getting the image straight, side to side just a little. Good. X-ray. Okay, so we want to see that the patient is level, and it looks like they're—if we look at the line of the—boy that handheld's really bright. Can you Iris down a little bit on that?

That's better. We can see that better.

Okay, so what we want to do is a symmetrical picture of the opterator faramina. So you can see the acetabular cup on the opposite side. Teri, can you tilt the table toward me just a little bit? Yeah, just—good. Okay, x-ray. Okay, so we're just leveling a little bit. The obturator faramina look a little more symmetrical there, and I think the table's pretty level now. Okay, in and out toward me, Sehala.

Now side to side. So I brought the table up a little bit, x-ray, and side to side a little bit. Let's see, x-ray. What's that density? Is that something under the table? Is that the folie or what? Okay, maybe that's the protractor. Okay, why don't you abduct it just a little bit, Tina, alphabate? Good, all right. X-ray. Okay, so we've got—here's our pre-operative—I can probably take this out here. X-ray.

If we could look at the x-ray box—that's better, thank you.

Okay, Hamid, look up—is that me there? Yeah.

There we go, there we go.

Okay, can you zoom in a little? Okay, so put that picture on the right and print it. So that's going to be our radiographic reference.

So again, this is x-ray steps you wouldn't take if you were using the other side as your reference.

I think it looks okay, yeah. Because we can see a little bit of the lesser troch there. So we have the leg a little internally rotated, we did already, lock it. Just a second, x-ray. Maybe that's a little better. Why don't you print that one, put it on the right. And one of the things—we're seeing the neck appears more verous now with more offset than it did on the pre-op view we took in clinic, because of the rotation, you see, because we've internally rotated it to show the maximum offset.

That's—my—think one of the big problems with templating, it's hard before surgery to know what the offset really is, because the femoral rotation varies so much. Okay, take the image out. Okay, let's go back to the overhead camera.

Dr. Madda, we've gotten a question from the audience about the gloves that you're wearing in this procedure and why they're different or better than those of your assistants. He mentioned that you've got the beloved green gloves. I don't know how you did it, but can you—

Yeah, these are old stock. They aren't available anymore. I use these white cotton gloves, but I like the cotton gloves that they're wet, because they grip the instruments well. So I use them for all surgeries. Okay, so this tip goes lateral to the hip capsule, hibs.

You know, Dr. Madda, I think we lost a little bit of that dissection. So what you did was you dissected the tensor muscle belly off of its medial fascia, is that right?

I just ran my finger, medial to the tensor, and put it on the hip, and we're down to the hip. So with the anterior approach, basically this is—try not to hit the camera—is the—I would say it's the simplest approach to the hip.

This retractor that you've placed, it looks like a cover retractor.

(Inaudible) isn't working here.
Where is this retractor that you’ve placed?

What do you have it on?

So it appears to me that we’ve got a covert retractor placed over the superior lateral neck, extracapsular, retracting the tensor muscle belly laterally.

And then this is just retracting--we can see the rectus femorus is right here, and this is retracting the rectus. So I’m going to take a Holman tip. We’ve got--it looks awful bright in there. Okay, so you’ve got a Holman tip I’m placing on the anterior capsule, and I’m just going to put this tip on the anterior capsule.

And now that’s a little different than what I was taught when I was with you, when you--

Yeah, I didn’t tell you all the secrets. Okay, just hold that there. Let me have a tonsil clamp, please. Okay, now we’re going to see--yeah, I can see the other monitor up there on the wall looks a little better, so probably we’re okay. Okay, so I’m going to--these are the lateral circumflex vessels that come into view at this point.

Do you actually see the vessels well yourself, Dr. Madda? We see just--it looks like a line of fat and maybe fascia from out here.

You know, I think the--I’m not sure. Does everything look real bright to you, Tanya?

Yeah, we’ve got a glare.

I can see--I’ve got two monitors in the room. One’s showing a lot of glare, the other one looks great.

It’s looking better now.

Yeah, so I think it actually is making a very good image, you know. It’s just that some of the monitors we’re looking at aren’t so good. So I’m cauterizing these lateral circumflex vessels. You see I’m doing it--

It looks like there’s a fire in there. Is there ever a time to place clips, or do you just--you cauterize them, and is that sufficient for hemorrhage control?

There’s nothing wrong with placing clips.

But you don’t find it necessary.

I usually don’t. I mean, some people tie it off. Now I’m palpating kind of a fascial layer, distal to that, and I have to release this fascia. You’ll see over here, have a little bigger view on the jib camera? Zoom out, you’re going to see the tensor move. See it move a little bit?

Yeah, that was really dramatic actually.

Yeah, so it actually allows--what we’re trying to do is allow the tensor to move a little bit more lateral with that.

Now if you skip that part of the procedure, if you don’t release that fascia, where will you have difficulties as you go along?

You’ll just have difficulty with some access, all the way through, and particularly--and the trouble is that you end up pulling harder on the tensor and you’re more likely to tear the fibers of the tensor fascialata. So the astabular rim is quite proximal up here. So I’m going to go to the astabular rim, and I’m cutting parallel to the neck. So the anterior capsule is here, the lateral capsule is there. I’m cutting parallel to the
neck, and I cut distally here, and I have to cut distally so we can get far enough down to see the entire saddle of the neck. And so I can palpate with my finger, and I feel a tubercle on the anterior lateral greater trochanter.

So I have to come with the incision a little bit lateral to that tubrical, and I'm going to go around that just a little bit distal also. Now we can get some consistent--

So it looks, Dr. Madda, as though you are using both the aquimantis and an electrocautery. We've got a question from the audience as to how important is the aquimantis to this surgical procedure, and do you use it every time?

I use it every time. You can do the procedure without it, but particularly here along the capsule, and it kind of allows you to, you know, sometimes you don't even see very discretely where the bleeder is, but the aquimantis can go down the hole, even with the presence of blood, and stop the bleeding. So it's-- sorry you got a lot of--you should have a suction in there to get the smoke out.

So you said that your capsulotomy starts just at the asatabular (inaudible) on the border of the bone there, and then you came distally and laterally to the (inaudible) on the anterior portion of the reater trochanter. Is that right? You use the word “the saddle,” what are you referring to when you said the saddle of the femur, or the trochanter?

Well, I used to call it the saddle of the neck was--had a lot of arthroplasty surgeons use that term. It's sort of a saddle, or kind of a shoulder of the neck, I call it. It's just where the neck goes horizontal, in its upper portion, and joins with the medial aspect of the greater trochanter. We have to see that point as the neck goes from an oblique orientation to that horizontal orientation. I'm going to put this retractor inside the anterior capsule, okay.

Is that a cover retractor you just placed?

Right. And then we have the suture. I'm going to put suture in the lateral capsule. And so I think as we go through this, Tanya, we're going to try to show the viewers here the exposure you get, the basic steps and stuff, probably all of the--well I would say certainly all of the tales in how to do the surgery aren't going to be learned by the viewer in this one video presentation, and we have cadaver courses for that, but we'll try to cover as many details as possible.

So you can--now we have the capsule. The two retractors are inside the capsule, so we have a very good view here. Here's the head and neck. Now here's some of the capsule--let's see if I can try to get--it's hard for the--right here there's a little bit of capsule attached to the base of the neck, so I'm going medially across the anterior neck, and here you can get some bleeders too, but I'm cutting the capsule off the base of the neck.

And now what is that muscle belly that we see, directly--

That's a vasus lateralis. Vasus lateralis is right here, okay. Now, we have to have a small homen. Okay, so I'm going to come inside the capsule, over the anterior rim, and I'm going to lift this up. Could I have a rondeur?

Oh, if we could get that camera to drop down in there just a little bit more, oh that's perfect, thank you.

Okay, so can you see what's going on, Marylanda? You got to monitor--okay, so I was just asking my PA assistant that she could see, too. Could I have a knife? So you can look at that camera, too, make sure if you can do anything to see what we see. So I'm just cutting--this is some just sinovial tissue, intracapsular. We had kind of an ossical near the anterior rim. When we look at the x-ray, he has most of his narrowing superomedially. Do you have the osteotome now? So usually what I'll do is look at the x-ray. On the x-ray I don't see much of an astabular osteofight, but usually there's some ossification of the astabular laborum, and that's the beginning of the astabular osteofight.
So I’ll cut that off, and you can even just cut a few millimeters of the—suction, please. Few millimeters of the lateral rim. Okay, good. (Inaudible.) And this will be to get access to the head. Okay, let's see now. We can--okay, could we have some traction, please? Okay, we had a nice picture of the head distracting there, now, okay?

Yeah, so it looks like Tina put two turns of traction across?

Yeah, three turns on is usually standard. Now I'm going to put the skid between the roof and the head, okay, take two turns off.

Now why did you take those two turns off?

Well, because I want to put the skid medial to the head, then. If there’s too much tension it’s hard to get at there. So now, okay, unlock the rotation. So I’m going between the head and the anterior rim, and around the medial head, okay? And sometimes--and I think the dislocation--what I'm going to do is an important step in freeing up the--is the rotation unlocked? Okay, it’s freeing up the head.

What you just did, getting that hip skid in on the medial side is one of the things I always have had a problem with. Are there times where--and you're going towards a dislocation. Are there any tricks to getting that skid into the medial side of the joint?

Well you have to push in the right direction at the one place, and you have to really thrust with your body weight and your legs. If you just sit there pushing with your hands, it’s not going to go in. You have to have enough confidence to push hard. But you can also go over the pelvic brim and push the skid right past the pelvis into the soft tissues inside the pelvis, which is not a good idea.

So you want to make sure you're--

So the hip’s a little externally rotated, and with it externally rotated, this corkscrew goes directly AP; because it’s going to rotate more horizontal with the dislocation, I don’t want it to tear the tensor. So I’m going to take this retractor out, reduce pressure on the tensor. Rotation's unlocked? Okay, and then I'm going to just--

So you haven't used the table at all to do this now.

No, I’m just pulling the head out with the--by levering with the skid, and you can lever pretty hard and pull with the corkscrew, externally rotate, Tina. Now she’s helping me rotate. Lock the rotation. Okay, so now we have it dislocated, okay? Now this guy, he’s--sometimes big guys like this are very hard to dislocate. He’s--the astabulum is a little shallow so that maybe makes it easier in this case. This retractor here goes--the small Holman is just going just distal to the lesser trochanter.

This is around the medial neck, and now I’m going to detach more of the capsule from the base of the neck. So what I’m doing is getting some more thermal mobility which is going to help us during--zoom out just--that's pretty good, actually. Your picture's good. This is going to go around the medial neck again. Here we have some bleeders down from this capsule. Okay, and then--so I’m mobilizing the capsule from this medial neck, the posterior medial neck down to the lesser trochanter, and I’m of course going to preserve the iliosoa attachment to the lesser troch, but if I run my finger down here, you can't see what I’m feeling, but I can feel the lesser trochanter.

And you were just saying that in doing so, this is going to make it easier down the road to mobilize the femur?

Yeah, it's going to give me better femoral exposure when we get to that part of the procedure, but it's also going to help with the astabular exposure, just that the femur is now going to drop posterior, out of the way of the astabulum, a little bit more readily. After I take out this small Holman, I’m going to look for any
bleeding points. It looks pretty dry. Otherwise, this is a good place to use the aquamantis, too, just to get any capsular bleeders.

As far as the dislocation itself goes, Joel, are there any patients that you skip this step on and cut the neck in situ?

Yeah, one out of 200 or something, but internally rotate. And you mentioned it to me this morning, Tanya. Sometimes people with pervious astabular fracture unlock the rotation, where the head's really medialized, if they haven't had an initial good reduction of the astabulum, then they can be difficult and you may osteotomize the neck in situ, because the head is really kind of incarcerated within the astabulum. There may be a protrusional pattern arthritis sometimes.

So essentially what you just did though was increase your posteriour capsulotomy to the level of the lesser troch.

Yes. Well, yeah. What I did is we did the capsulotomy, then I cut the capsule off the intertrochenteric line, off the anterior femur, and I continued it around the medial femur. So we're going to--the neck cut, when we look at the template, should be reasonably long, but additionally when we got our x-ray here, we saw that he has more offset, so we may end up needing a verous neck, and if we need a verous neck, we're going to need to have a higher neck cut to get the same leg length, because the prosthesis won't go down so far. So I want to be careful not to--the keys here in making the neck cut, right for the sucker tip, is this is the saddle, the lateral shoulder of the neck, and from there I cut obliquely across the anterior neck.

So are you using any of the traditional landmarks that people that do this surgery from a posterior approach use?

I don't the lesser troch as a landmark (inaudible). Actually can if you want.

And are there any other pitfalls here in making this neck cut?

Well the neck cut, I'm aiming the blade posterior and medial, away from the posterior aspect of the greater troch. If you just go straight down, this blade excursion can potentially hit the posterior aspect of the greater trochanter, and cause a--cut it off, which you don't want.

To the extent that you're going to finish that laterally, with an osteotome, rather than use the oscillating saw, huh?

That's exactly what I did, yeah. I made it, I went through the osteotomy. So I left the posterior lateral cortex of the neck intact, and I just cracked it with the osteotome. So now it's through, and I think that's safer than trying to cut the whole thing with the saw. Now I'm rotating the round part out first, so that we don't catch muscle with the sharp edges of the neck as it comes out.

I also noticed you used those retractors to protect the tensor muscle from the saw edge.

That's correct, yeah, unlock the rotation and we're going to externally rotate about 45 degrees, lock it.

So we're getting ready to look at the astabulum, is that what's going on here?

Yeah. The other thing about dislocating the head is that dislocating the hip is when I used to cut the neck in situ, I started that way, sometimes I'd spend 15 minutes struggling, trying to get the head out. And if you just dislocate it, free everything up, you see the head comes up.

So now the hip's rotated about 45 degrees. There's still very light traction, only one turn. This tip of this retractor is going over the distal one half of the anterior rim. So the tip is going to be on the distal side of the pectineal eminence. And then--so if you've done (inaudible) approaches, if you've done periastabular
osteotomy, you’ve seen the pectineal eminence. Okay, do we have the other camera set up, the laparoscopic camera? Okay, so now this other retractor is going outside the laborum, just posterior to the laborum, inside the capsule, and Hamid, you’ll have to--

And that small amount of external rotation--well, not small amount, 45 degrees of external rotation, put it on the leg, really help get the greater trochanter and the femur out of your way, to get this exposure, is that right?

Okay, are we on that camera now with the--

No we’re not yet, we’re still on the overhead.

Okay, can you go to the laparoscopic camera. Hamid, you have to look up here at the screen to see what you’re seeing here, okay? Bring it in closer. Can you suction it, one hand?

Well it’s kind of funny, because this is the one part of the astabular exposure, is actually something you can see really well with this incision, wouldn’t you say? Ironically we can’t get the camera in there.

No, we’ll get a good view here, Tanya. Okay here, give me this. You see it now? Put on--there we go. This is--now it’s something--okay, we see now? Why am I seeing the--there, that’s what I want to see. Except why don’t we have a focus? Do I have to focus something here? This ring here?

So we’ve got one retractor over the (crosstalk) and we’ve got a second retractor under the posterior wall, intracapsular, and under the laborum, with the leg externally rotated about 45 degrees to get the femur out of our way.

So here’s the astabulum, okay? See then?

Yeah, we can see that. It’s a little fuzzy, I gotta tell you.

Okay, why aren’t we looking at the laparoscopic camera? There we are.

Now we can see it.

Okay, now we see that, okay? Can you hold--hold it steady.

And we can see your retractor over the anterior wall by the (inaudible) eminence, a little distal.

Okay, here’s this anterior capsular fold. We need to cut that.

Okay, we see that.

Okay, and then we have residual--we have some bleeding for where I cut that capsular fold, so I’m going to have to--and this is just to get a little better access for getting the cup in, that I cut that fold of capsule.

Yeah, I find that really important, especially if I’m doing a hard bearing surface, a hard-on hard bearing surface, to get better exposure down there.

Let me have a knife and pickups. You have to hold this here. Okay, are you showing him? So we have to have now--here’s our--what are we doing, lap camera?

Lap camera.

Just keep it on lap camera, okay? Why are you not--okay, we don’t see--why is it so dark? We’re seeing good here on the wound, but--okay, so I’m cutting out the posterior laporum, okay. Now this is a view I can see very well, it’s just for the--tell the viewers, you get this view, the surgeon does, but the overhead
camera's at the wrong angle. So that's why we're using this handheld--sterile handheld camera, because the overhead camera's at the wrong angle. So can we have a knife and pickups?

And we were having a little bit of a hard time--maybe Joel if you could point out to us where you made that capsule or incision or the episiotomy of that redundant capsule distally. We couldn't really see very well when you did that.

All right, I'll try to show you. Hamid--so that's right down here.

Okay, you're pointing to it with your sucker?

Yeah, with the sucker right there, we've opened it up.

Sure, okay great, thank you.

Okay, so here we can see the astabular fossa. Let's start (inaudible) so just stand back a little bit. Which view are we seeing, is that the laparoscopic camera? Okay, zoom in. Bring it in, Hamid, closer.

So what size are you starting with here, Dr. Madda, with this first reamer?

I'm starting with a small reamer, a 42 or a 44. Even though it's a big astabulum, because--hold this reamer here--so now very often with the first reaming, I'm going to get some bleeding from the astabular branch here, (inaudible). Now I think that's well controlled. Okay, do you have the reamer again? What is size here, 46? Okay. Okay, we want 46. I skipped a size here. We're at 50. Looks like--huh? Okay. 50. Now it looks like we're going to keep going a little bit up here, but--okay. Okay. All right, let's look at the x-ray now. So we're up to 52, and I was thinking maybe 54. So we're going to--what? Yeah, jib camera let's go to.

Yes I can.

Jib camera. Okay. Why don't you just show me the--can we just put this as--keep that as what's being shown? Okay, so we're going to check to see that the pelvis is level again. X-ray. Okay, side to side. X-ray. In and out toward me. Okay, can you push return to level on the table, Teri? Let's just go back to zero point here.

So now we've started reaming with the C-arm, or you're getting ready to use the C-arm.

Right, okay. Now, x-ray. Okay, so the pelvis in and out toward you a little bit, (inaudible). X-ray. Okay, so the pelvis looks level, the lordosis looks like maybe he's lost a little bit of lordosis from the pre-op view.

How have you judged that, Joel, how did you make that--

Because the obturator faramina have lost some of their superior/inferior height.

Compared to the preoperative radiographs?

Yeah, so okay. Now can you get a bigger picture with the handheld camera? Zoom out. Zoom out quite a bit, okay? Okay, put on the image where my hand is, okay? Zoom out. Okay, good. Okay, good. Unlock the axial tilt. So we're going to tilt it a little bit. Go about five degrees, Sehala. Okay, is that it? Okay, side to side a little. Okay, good. X-ray. Okay, now the obturator faramina look a little more like the pre-op view, so the--actually the coxis has moved a little bit distal in relation but we're trying to duplicate the lumbar lordosis we saw in the pre-op view. Rotate it a little clockwise on the picture, so it looks upward. Okay, in and out toward me.

If they could zoom back out so we can see what you're doing with that C-arm machine to make your x-ray look--thank you, that's really helpful.
See, that’s what we were trying to do is see the screen, was what we’re doing here. Okay, x-ray. Okay, so in and out toward me a little bit.

So to improve the lordosis, you changed the cant on the machine towards the (inaudible) a little bit, is that correct?

X-ray. Yeah, I aimed at cauded (inaudible) a little bit.

And now you’ve centered over the hip socket.

X-ray. So we could--x-ray. So we could see on the pre-op view, for instance, that the cup on the other side is kind of lateral and proximal. So I’m trying to avoid that here, you see, by getting it--x-ray--medial enough--x-ray. Okay, there we go. And not for preserving some of the astabular roof, we’re not taking the entire roof away. Is that a 50 (inaudible)?

This is going to be a 54 and that is (inaudible).

Okay, so we template it. We may go one up. This is 54. We’ll see if we like this.

So it sounds like you’re checking the size of the cup as you go. Clearly you’re doing some adjustments with your hand to change the antversion of the cup as well as the abduction angle of the cup.

What I did, yeah, is I aimed slightly more proximal in order to go get the reamer to go a little bit more proximal.

One of the questions I have from a viewer is what is your ideal anoversion for this cup?

Well, for every patient we go about, usually go for about 45 degrees inclination, 25 degrees antversion. I think we’re going to go 56. Danielle said 58, I said 54, so maybe--I thought maybe I’d be right this time, but--x-ray. I think it’s more accurate. If you get a--with the computer guidance you get an x-ray to see if the computer’s right, after surgery, but actually the anoversion has been, I think, a little bit of a problem with--I think computer navigation’s a good tool. But you have to consider that when you get a computer navigation, you’re getting a virtual picture. So the accuracy of a virtual picture depends on how accurately you identify the reference points, and also you’re going to get inaccuracies if your pins put into the bone deflect or bend at all.

X-ray is an actual picture, so it’s an actual picture rather than a virtual picture. Computer guidance is a good way, but I think probably at this point the x-ray is a little more accurate.

Certainly in your publications, your ability to obtain the version and inclination that you want was extremely accurate.

Okay, so we reamed with 56, and then I just go line to line. I put in a 56. This is a cup with no holes.

Are there times that you use holes, or do you always go with the no hole variant?

X-ray. Pretty much no holes.

And it looks like you’re using an offset inserter there?

Right, x-ray. Yeah, so it doesn’t lean on the wounds so much. So--okay, so right now, Danielle, do you have that template you can put up? We’re going to overlie the--this isn’t necessarily a routine, but you showed her the one I wanted her to put up, right?
Okay, so zoom in on the image screen. This is—keep zooming in. Zoom in, zoom in. So we’re going to look at—you can see this ellipse. Get the ellipse centered over the cup, though. Put the X—see the X in the middle of the ellipse, put it over the middle of the cup. Okay, all right. So that’s going to show, and do you have the edge of the plastic parallel to the edge of the screen? That’s a lot to do there, but—okay. So this is just—you can see that ellipse on there. That’s the way a 45/25 cup should look, okay, and that is a single AP view of the hip with an x-ray is an accurate way to tell inclination and anoversion.

Okay, so that’s a 25 degree anoversion ellipse, with a 45 degree inclination.

Yeah, see, and I just changed the anoversion a little bit, tapping it. I took a little anoversion off to narrow it a little bit. An incidentally, a cross-table lateral is not an accurate way to tell anoversion. That does not tell you anoversion accurately. This does tell you anoversion inclination accurately.

Now is this ellipse something that you have just in your OR, or is this something surgeons can find to help them?

Well we give it out at the courses, at the Pew-sponsored anterior approach courses. We give out these images like this. So you can take that down, Danielle. Thank you. X-ray. Okay, so that looks good, I really like it. And now I’m going to take the insertion handle off. X-ray.

Okay, I think that’s a good picture.

Joel, what would you say the more common mistakes with cup placement is?

Well, when you start anterior approach, the mistake with anterior approach is to get the cup too vertical, too much inclination and too much anoversion, but that’s right about 45, 25 anoversion. Take the fluro out, please. So we’ll just leave that up there temporarily, but I’m going to go back, put the retractors back in. Okay, we’re going to see if we can use our--laparoscopic camera, please. Okay, thank you. Can you show them the view? Okay.

And I have a question from the audience. So we see that you’re putting the manhole cover in there, not to be confused with the womanhole cover?

Yeah, just to give equal deference to each. Sometimes they call it the womanhole, sometimes the manhole cover, yes.

Exactly, thank you for the equality.

Could we have some irrigation (inaudible)?

I have a question from the audience about the way in which you’re holding the reamer. So and this is obviously quite different from people used to doing this from the posterior approach, where they’re going straight down on the patient, to centralized or medialized the reaming, whereas you’re going directly across the table as the patient is supine.

Yeah, I don’t necessarily try to point the reamer in the same direction as the cup’s going to go in, and in fact, I think that’s the wrong way to do it, because you end up levering the reamer shaft off the inferior portion of the wound, and then you drive the reamer into the roof, and you get a picture like his opposite hip, where the roof has been reamed away. So the reamer should—okay, handheld, big picture, handheld. Okay, so we have put your hand over the wound.

So no trial liner, huh, going straight to the real thing. And that’s a neutral liner with no posterior lip.

Okay, lap camera. Okay, so all right. Now we can go to the--probably just go to the jib camera, okay?
Yeah, we just have a neutral liner. We’ve put that in. So the reaming direction, usually the reaming has to be a little bit anterior to posterior, okay. So the reaming has to be a little bit anterior to posterior. Now move the camera away from me, please. Okay, now center it over the field again, move it a little more away from me. Okay, center it over the field. So the reaming has to go a little anterior to posterior, in order to keep from reaming out the anterior wall, but it shouldn’t be directed as much superior as the cup is going to go in, or you start to lever the reamer off the inferior wound, and it drives it into the roof, unless you use an offset reamer, but I don’t think that’s necessary, really.

I’ve got a question here from the audience again about this cross-table lateral fluro x-ray, after you implant the astabular component to judge your version. And you don’t. You just said that, in fact, that’s not an accurate way--

No, it’s wrong, you get the wrong view. It is not a way to—a lateral fluro or a lateral x-ray doesn’t give you anoversion.

And then there’s another question--

I hear that at meetings from big authorities, but it’s wrong, okay?

Check. Do you always ream line-to-line, or is there ever a time that you ream one under, somebody would like to know.

Once in awhile, you know, sometimes maybe an osteoporotic astabulum. Sometimes if you’re doing a total hip for a bipolar and the bone seems soft, but almost always line to line. Okay, unlock the rotation once more, Tina, let me just check it. So what I’m doing is I have my hand on the foot. Can you show us a big view with the--something, okay. So my hand on the foot down here, and we have the rotation unlocked, and I feel the knee, and then I’m going to externally rotate it myself. Lock it.

So Joel, we missed this part, though. You put a hook into the patient’s leg. What’s going on there?

This hook went around the proximal femur, just distal to the vast lateralis. This is going to be attached to the (inaudible).

And is it right on the bone, that hook?

No, it’s outside the vastis muscle. Okay, can we extend and abduct to hip?

So you personally externally rotated the patient’s leg.

Right, and so if you have an osteoporotic old lady, you don’t want to twist very hard. So I’m doing that myself and I can feel the torque on the--the table doesn’t act independently, and I can move--always move the leg myself. Here I can grab the knee, I can feel there’s no tension on the leg, which there should be no tension when it’s extended.

And how much did you externally rotate the leg? Because we can’t see--

I put--the knee is pointing out just about 90 degrees to the side, about 85 degrees out. I can palpate that, so I know where the femur is. Then if we were to look at the foot, you would see that the foot is rotated out probably about 120 degrees. It’s beyond 90, because of flexibility of the knee ligaments, and down at the foot and ankle.

The leg seems to have been extended now, and is down on the--is the spar on the ground?

Yeah. Spar is on the floor.

And AD Delta--
Why don’t you take the handheld to the foot of the table, and show them where the foot is?

That would be great, because we really are having a hard time getting our perspective there.

Yeah, so just stick with the jib, okay? All right, now--okay. Now this--we need a bigger view on the jib, bigger view, bigger view. Angle it toward me a little bit. Okay, so now as I raise up the femoral lift, I'm feeling the tension here, okay.

So you’ve got the hook in the bracket?

Yeah, the hook’s right here and I’m pulling on the bracket, I’m feeling the tension. So I’m lifting the femur, but I should always be able to lift it a little bit higher than it’s actually going. Okay, now this retractor here, it’s a big cobra. It goes medial to the proximal femur. Could I have a tonsil clamp? So if we look at the landmarks here, here’s the calcar. Zoom in now.

So that’s medial, that’s the calcar--

Good, okay, so now we have one assistant holding two retractors, as cobra medial to the posterior cortex, and this trochanteric retractor with the tip around the greater troch. Here’s the medial calcar of the femur, the posterior cortex, the anterior cortex. Here’s the lateral capsule, you see? That’s still attached inside the greater trochanter. This (inaudible) kind of sinovial stuff here. Could I have a knife and pickups? I’m just going to cut out this little--this is a tensor fascialata muscle here. I’m going to cut out this little bit of sinovium. Okay, suction.

But I see a lot of surgeons, one thing they have trouble with at this point, they can’t get the femur externally rotated, or they don’t get this much exposure, and I think they haven’t gone through the steps at the beginning with the mobilization of the femur.

The dislocation and the release of the capsule.

Yeah, so let me just--that’s good right there. Okay, so I don’t want to--I’m trying to show you--I don’t want to pull too hard here and damage his tensor, but Hamid is going to pull a little tension. Here I’m going to release--start here at the lateral, the anterior edge for the capsule, the anterior lateral capsule, and I’m cutting the capsule now off the inside of the greater trochanter. So you see I’m pulling it with the suture here?

And you put that suture in at the very beginning.

So let’s just watch this, so you can see a little better. Yeah, I think you have a nice view on there. So I’m coming down, and the tip of the knife, I can just feel it go all the way down to the bone of the medial greater trochanter, and then it allows--so we have the capsule pretty well off the inside of the greater trochanter. And I’m going to cauterez this with the aquamantis, coagulate this hot edge of the capsule.

Then I go back here, and I kind of prophylactically cauterez along the--where the circumflex vessels would come on in the posterior lateral (inaudible). And I’ve got a long neck cut, as I said, because we have to lengthen this guy a little bit. Then I’m going to come tip over the tip of the greater troch, and I want to regain the length by having my femoral prosthesis maybe a little more proud in the canal than I normally would. I don’t want to regain length so much by adding head sizes, because when you add head sizes you increase length plus offset, and I’d rather just increase length on him.

Now what is it that you’re doing right there, Joel, with that rondeur?

It’s a good question. I should tell you, shouldn’t I? So rather than just start doing something. Okay, so this is a standard step, that is a remnant of the lateral neck that I’m cutting away, and so this is after a neck cut, it’s kind of a lateral--and so often times, surgeons would use like on a posterior approach you’d use a box chisel osteotome, but here we’re just going to use the--
The rondeur.

Yeah, the rondeur to get this lateral capsule--

Now have you see the puroformis or the obtrator internis tendon?

No, I haven’t.

Are we going to?

Well, we’ll see here. We’re usually going to see the obtrator externis tendon. The main thing we’re going to try to do is get adequate exposure to broach the femur.

And this is a larger patient, as far as his size, his height, and the muscularity of his femur, so he might be more difficult than--well, than the patient I saw earlier today, for example.

Yeah, maybe so. You never know, and it’s part of the problem with--another problem with operating without the table, if you think, well I’m going to do this easy case, you know, because I can do this without the orthopedic table, and sometimes you start operating, it turns out to be much harder than you think. So right here, I think I’m seeing some of the fibers of the obtrator internis tendon, right in here. Can you see some of that?

I see that, yeah.

Yeah, right on the inner aspect of the greater troch, and we have good femoral exposure. So I don’t think we need to do more with that. We can leave them there. Could I have the--

If you didn’t have good femoral exposure right now, Joel, what are some of the things you would think about doing?

Where’s the other one? Oh shit, okay. Somebody threw my instrument on the ground. It might have been me, I suppose.

Blame somebody else.

Yeah, I didn’t throw it at anybody, honest.

But I was just asking, Joel, so a lot of surgeons have a hard time at this stage in the game.

What you want to do--the key of this is that I can feel the tip of the greater troch, right where the sucker tip is. That’s the tip of the greater troch, right back here, okay, and so I can push with my finger and I can feel that, but if you--a key is to keep cutting along the medial greater trochanter. Put the camera away from me a little bit. Okay, and toward the foot of the table a little bit. Okay, good. Now aim it away from me a little bit, there we go. Okay, so that’s good. So if you cut--do you have a knife? And you get--so if we were to cut here, you see?

Yes.

And cut longitudinally along the inside of the greater trochanter, until we see the bone of the medial greater trochanter, that’s a good indicator you have enough exposure, okay?

Okay.

Okay, now we do have a long neck cut, as I mentioned. It’s probably too long, but it’s easy to shorten. Let me try putting in this retractor once more.
And that’s going on the posterior neck?

Yeah, and so what I wanted to show you is right here, here’s the obturator externis tendon right there. See the white?

Oh yeah, we see it really nicely.

Okay, so this obturator externis tendon, this is the main anti dislocator of the hip, and here it comes right into what people call (inaudible) irrigation. What we call the pure formis fossa, but this is something that invariably gets sacrificed with posterior approach.

The obturator externis tendon.

Yeah, you can resuture it, but whether or not there’s an actual repair and it heals back I think is always in doubt.

Now even with the anterior approach, people talk about in some very, very difficult cases, they might release some of the short external rotators. Could you mention something about that?

Yeah, well I was talking about that, that if we’re going to cut down to see fully the bone of the medial aspect of the greater troch, we may cut the obturator internis tendon, to get more mobility. If you see even on this very big guy, we’ve got a very good--can I have (inaudible)? I’m going to put in one retractor I don’t normally put in, just to give you a better view of the femur here. But you see we’ve got an excellent view of the femur, so I don’t think--so now the broaching is going to start near the calcar and near the posterior cortex. And usually my assistant, Hamid, is going to lean on the distal thigh to help with the adduction. Could we get--

Add, A-D.

And so he can get--do you have a lap sponge here?

So you’ve got the hip externally rotated, extended, and now A-D-ducted with Hamid pushing a little bit on the knee with his hip.

Right there, right there. Okay, so you can see the--here’s the--now let’s go to the handheld camera. Okay, zoom in. Okay, so we’re going to start--as we start broaching, here’s a broach handle here’s a broach, and the actual--could I have a marking pen? The line of the femur is actually going to be going about like this.

Your shoulder’s in my way, thanks.

Yeah, here’s about the line of the femur, like this. So you can imagine that the broach is actually heading about like this. You see, it’s starting to head toward the lateral cortex. So always--do we have the handheld? I wish you had the handheld on this one up here, I do now.

Okay, so now I push toward the floor. I push toward the floor with my handle to push the broach toward Valgas, you see? So I’m pushing down, I’m hammering, and--

And I can see it curving around--

Yeah, so now you see, it’s going essentially this part of the handle is essentially parallel to the shaft down here. Okay, all right.

So there’s something about that broach--that broach has an offset that’s different than what some people doing the posterior approach might be used to.
Right, so here’s the broach. This is in the shaft. Here’s the offset, so it clears the anterior superior spine. It’s going just like this, okay.

If you ran into a situation where you were afraid--so if you didn’t make the curvature of the proximal femur and get down the shaft, you would penetrate the cortex. I can see that from this side, that you would come out essentially the lateral side, then.

Yeah, the danger of perforation, when you go, is toward the floor, which is lateral cortex, or away from you, which is posterior cortex. Okay, now what’s the templated size, Danielle? And what are we on?

Is there anything special about the broach itself, Dr. Madda, the curvature of the broach or the point of the broach--

Well the (inaudible) broach is kind of nice because it has this round sort of bullet-tip shape, so it tends to follow the inside of the bone.

Rather than perforate.

Right.

I’ve got a question from the audience regarding how you’re determining the femoral component’s anoversion.

Well, the first thing was, is that--yeah, are we back to overhead camera? It’s probably a good one. Okay, so what we’re doing then is we’re--I could palpate the patella, so I could feel the femur’s externally rotated, I can feel that. Then, as I look at the femur, zoom in now, please. As we look at the broach going in, the plane of the broach is going to be relatively parallel to the plane of the posterior cortex, the posterior cortex, and it’s going to be not quite parallel to the anterior cortex. But initially, when I’m making these first few--and the broach is going to go very close to the posterior cortex, because the femur--the femoral neck sits anterior on the shaft.

But the initial orientation of the broach is mostly I’m just reaching down with my right hand, palpating the patella, to get an idea of the femoral rotation. And then I can see the rotation here, and keep in mind that especially on men, femurs have very little anoversion.

So are you trying to match the patient’s native anoversion, or are you putting ten degrees of anoversion into your stem?

No, I think with most of the (inaudible) broaches like this, the broach goes where it goes, and it’s determined by the plane of the posterior cortex. What size is this? Okay, let me just take a look here. Okay, so right now, the template shows that the broach may be even slightly proud. Let’s just try the standard neck in five. We’re going to template with a 12 that feels fairly tight. We can always go up one size, just take the templated size here. We’re going to do off the template, but like I mentioned--okay, don’t take it out yet, please. Okay, flex the hip, please.

So we’re getting ready to reduce these trial components.

Right. Could we have a big view, with the handheld camera? Can you stand back a minute, Hamid? Okay, so he’s going to--so I can--so unlock to rotation. So I can feel the foot, and a lot of times here I’ve got one hand on the head, the other one on the foot, and I just reduce it like this, I just push down on the foot, and now we’re reduced.

So you reduced it yourself.
Right, lock it. So you can do that, and you get--people are asking about the shuck test, how can you tell soft tissue tension. This is a good way to tell soft tissue tension, you're just feeling how hard is it to reduce it there, which gives you kind of a ballpark feel. So he was--we have Dr. Weber, he's paralyzed, isn't he? Yeah, he's paralyzed, so I still took some effort to reduce some, so it's probably lengthening him a little bit, which we want to do. So we're going to bring in the x-ray now, take an x-ray. Okay, side to side. X-ray. Okay, side to side, a little more. Okay, in and out toward you. Okay, let's see. Rotation looks--unlock the rotation. Lock it. Okay, we'll get the rotation symmetrical x-ray.

To the primary x-ray you took at the beginning of the case.

Yeah, that's what we have. So we've got--can you see--yeah, and you've got that on your picture there. We've got both x-rays I'm looking at, that we can see from the beginning of the case, and the length actually looks pretty good, you know. The only thing is--

How are you making that assessment, Dr. Manna?

I'm just eyeballing it right now, I'm looking at one picture versus the other. The length looks pretty good. I think maybe I'm lengthening them a little bit, but let's--so we're going to--now Sehalah, bring the machine toward you. I'm going to look at the opposite hip now. Did you print that one on the left? Okay, print the one on the left. Okay, x-ray. Okay, side to side, toward you a little, okay good. X-ray.

So now we're going to get a comparable x-ray of the--

We're going to unlock the gross traction on the other side, because sometimes with the total hip, you actually distract it, pulling on the leg. Okay, take an x-ray. Okay, print that one. Okay, so now I'm going to go look at x-rays. So I think I can rotate the x-ray viewbox to help you out with your handheld camera here.

So this is a portion of the surgery where you're going to establish leg length.

Yeah, that's what I'm trying to do. I'm looking at leg length plus offset, so I'd like to have the offset correct and the leg length correct, but like we said at the start, since he's too long, over here on his left side, and he wants to be correct, you know, what are we going to do here? Have to make a decision. I haven't given you an answer. Maybe I don't know the answer. Okay, so now we have--here's his pre-op x-ray, the right side. And we have the pre-op at the left side, so it's actually getting--it looks like it's slightly shorter than the other side. Now let's look at it compared--

You just held the broach components up, did you?

Yeah, right. So this is with our trial component in here, it's a little bit longer than it was pre-op.

So you're matching up your pelvic landmarks, your radiographic landmarks on the pelvis, it looks like, and then looking at the profile of the femur after that overlay.

Yeah, if we're going to compare--wow. See here, if you compare his--you can let go there, but if you compare--if we overlie the femur, this is a pre-op. Here's his previous total hip. Give us a bigger view, so they can see this. See, here's the previous total hip, here's the pre-op hip. You can zoom in a little now. So if I line up the femoral landmarks, and--do you have a marking pen? See, look where--no wonder he feels so damn long. See, here's the two teardrops, you see?

I do see that.

I'm just saying, this is--you know, people are always talking about posterior approach is so good, why do we want to change anything? This to me is a big problem. You get this leg length and offset is just off, all the time. I see this again and again. I'm not saying it happens every time, but I see it very frequently. So here you see--you see the two teardrops on the two sides?
Yes.

So this guy is—he said he’s—yeah, he’s—it’s about what he is, he’s about over ten millimeters long, on this side, you see?

Well don’t people say that patients tolerate two centimeters of leg length discrepancy without a problem?

Yeah, so anyway, I mean, I think if during surgery we see it’s two millimeters too long, I try to fix it.

Not two centimeters, two millimeters.

Yeah, okay. But now if we look at—okay, so we drew that. Now if we’re going to look at a—okay, so here’s my current trial. Looks like I’m making them longer, you see?

I see that.

Okay, so the offset’s pretty comparable, because when you look at the two sides, and we can judge the—
one way to judge offset is we can superimpose the (inaudible) line. We can do that on both sides. Okay, so the offset looks good, but he’s—and we’re making them longer.

How much longer is this trial at this point, about three or four millimeters, maybe?

Try to measure it here. I’ve got from—just draw a little line from the bottom of the teardrop here. A lot of times they use the teardrop. You can use the ishium in that too, but sometimes the ishium’s asymmetrical. Another thing we can do is we can line up the pelvic landmarks, and look where the femur is, you see? And so I can look at—here’s a lesser troch, which might be better here. Here’s the lesser troch now, and we can look at—see how we’ve lengthened them?

You’ve lined up the pelvic landmarks now in this scenario, and we’re looking at the difference in the profile of the lesser trochanter.

Yeah, and then we can actually measure here. So he’s been lengthened about six millimeters, something like that. So, or I can start—it’s probably about five or six millimeters, something like that, but one thing we can see is we don’t need the big offset, the KLA prosthesis, okay? We could lengthen him probably a little more on this side, but I hate to go 12 millimeters like he is. I think he’s going to feel too long.

And I think you’re answering one of the observer’s questions, about the best way to predict leg length. You’re using an overlay technique, that is in your experience extremely accurate.

Well, the thing is, I mean, if you get—if you’re going to use bony landmarks at surgery, if you’re going to use soft tissue tension, if you’re going to use computer guidance, the final way you’re going to tell is sometime you get an x-ray. See if your landmarks are correct, see if the computers right. You get an x-ray. And so this is a way you can get the final answer right away, and I think you can get a better answer in the operating room like this, because we have a very controlled hip position. We can make the pelvis perfectly flat, both hips in the same position, same rotation of the femurs. We can get accurate x-rays. Post-op, you send them to the x-ray department, hips are in different positions, you don’t get an accurate film.

Okay, why don’t we take this off, and we can also see that the x-ray told us we’re going to put in probably a bigger stem here, too. Could you bring the—we’ll just take—okay, good. X-ray. Okay, so we’re going to go with a bigger stem. Take the image out. I just thought I’d get a trial x-ray, see where we were.

Now you were saying previously that you’ve left this neck cut a little long. Is it too long for you, or is this--

Can we dislocate the hip?
Is this--

Yeah, it’s probably--pull again. Yeah, I’d say it’s too long. Okay, extend an adduct.

So you’re going to show us then how you might revise the neck cut a little bit.

Yeah, I usually just use a standard planning device, (inaudible) planning device for the neck.

Rather than formally re-cut the neck with an oscillating saw?

Yeah, I don’t do that. Okay, yeah let’s get the view overhead, please.

There we go.

Okay. Okay, so now let’s (inaudible) okay, broach handle. I may not shorten him much if we’re going to lengthen him, you see.

I see.

We’re probably going to be going 14 (inaudible).

And what size are you on right now?

Can I have some help here? This is--what are we on now? Okay, could we try 14? Sounds pretty good. Take my glasses off. Yeah, take them off, yeah.

So you’ve gone up to a size 14. You said it sounds pretty good, so you like the sound of the broach in the femoral canal. It looks like it’s rotationally stable, something you noticed a little bit as you--I saw with your hands, you rotated, or you torqued the proximal stem a little bit. So looks like you’ve gone up two sizes from what you just templated, or trialed.

Yeah, and then I left the broach a little more proud, too, just to get a little more length, because we got--and the broach is quite solid. Okay, so we’re going to take this retractor out. We’re going to lower the bracket down, the hook elevating bracket. As it comes down, now I take the hook out. Reflex the hip, please. Okay, good, and okay, Tina, let’s reduce the hip. Tina’s pulling, I’m pushing. Okay, lock it. Okay, now the lap and the wound, we’re going to just take another trial x-ray here.

To reduce that hip, you haven’t put 14 turns of traction on, you--

No, we just pulled on the leg and internally rotated. We shouldn’t be putting on a lot of traction. X-ray.

My experience is if you need a lot of traction to get that thing to reduce, you made this thing way too long.

I agree. In and out, toward you. X-ray. Okay, so let’s print that one.

Joel, do you have this patient under general anesthesia, or is he--

He’s under general anesthetic. He is a general anesthetic with relaxation. Over the ears a little more. Okay, so we’re going to take another look at our x-ray here. We’re going to compare the two images. We’re starting to make this hip a little bit longer, but so I’m going to maybe go back with my--can you see here? Yeah, we have--okay, so we can--

A little bright.

Yeah, we’re a little bright.
But I can see you’re marking out the pelvic landmarks again for us.

Okay, we’re awful bright, I can’t see anything, okay.

There we go.

Okay, so I’m going to put down--here’s my reference, my pre-op view, and so now we can see we’ve--we’re lengthening here.

So you’re matching up your femoral landmarks at this point.

Yeah, I’m matching up the femoral landmarks, and I’m just measuring this teardrop. How much has the teardrop gone proximal? It’s gone proximal now--looks like about eight millimeters, okay, so that’s quite a bit of lengthening, actually. We can even look at--here’s the part of the obturator framen. The superior part of the inferior ramus. See?

Yeah, we can see that nicely.

So there’s a number of landmarks you can look at. I’m just trying to go by something we can see, all right, so this is just about--it’s about nine millimeters, you see, and so now I’ll take this side. I can compare this also to the opposite hip. So if you wanted to be equal to the opposite hip, and like I said, this is kind of a judgment game. It’s not an exact formula, but if we line up the femurs, you see, here we are, you see, it’s a little bit shorter than the opposite hip, you see, but even--look at this. If you superimpose the two pelvises, look at the two different cups, you see that? So that one cup’s really big, you see, and it’s kind of lateral.

We can also see that you’re not increasing the offset on the operative side that you’re working on now.

Yeah, I’m trying not to do that, increase the offset. So let’s just look at this once more. Actually, it’s starting to look pretty good here, you know? I think the--see his length is just maybe a little bit shorter. You see the offset, we don’t have as big an offset, and we have our length is just maybe three millimeters shorter, and that’s about what we want. Just my experience would tell me he’s going to feel good with a situation like that, rather than trying to stretch him out this whole, you know, ten millimeters, 12 millimeters or whatever.

Yeah, so you’re going to leave him with just a little bit of a leg length discrepancy, but not over-lengthen your operative side here.

Yeah, I think that’s going to be the way he’s going to feel best. Stephanie, grab the glove. Could I have some more water for these gloves?

And it’s probably worth pointing out just one more time that the maintenance of the iliotibial band is such that you really want to avoid over-lengthening, and certainly increasing the offset. I’ve had patients with pretty significant pain over--with an increased offset, with the anterior approach.

Yes, that’s correct. Yeah, that as soon as you lengthen them, it tightens the iliotibial band, they tilt the pelvis and they feel too long. Now when we look at our alignment of the stem and the shaft, as you can see, it’s--the center line is in slight veris, but as long as the stem is stable and you like your leg length and offset, this stem, the korai, will do very well.

So take the image out, and sometimes the korai will also come out in a little valgas, just depending on the internal anatomy of the femur, but as long as you have a good stability, the long-term outcome’s going to be very good.
Okay, let’s dislocate, and also you see it’s—okay, it’s not a real tight line-to-line fit. We don’t see that with the korai, because it’s a (inaudible) stem. Okay, extend an adduct. So we used—on the cup side we used a (inaudible) pinnacle cup, with the poly liner. Cross-link poly liner, and then we have the korai stem we’re using. Okay, now I’m feeling this tension again. This jack is very strong.

The jack for the brackets?

Yeah, I mean, it can actually--it can just yank the--you always have to feel it. Don’t let it get too tight. This guy’s got very strong bones, but particularly if you get an old lady with osteoporosis, you have to be careful.

And the reason is that you can bring that jack up so high that you break the greater trochanter off as you elevate the femur away from it, right?

That's correct, yeah. If you try to force things, you can break things.

If it’s hard, something must be wrong, Dr. Madda. That’s what they always say.

What?

If it’s hard, something must be wrong.

Yeah. (Inaudible) something’s right.

But it’s a really important point you make about the osteoporosis. You know, the greater trochanteric fracture is something we all fear with this, when we do the surgery, as the complication that at least the people doing the posterior approach say is our nemesis. But if you’re careful and you treat that proximal bone carefully, and the greater trochanteric region carefully as you expose the femur, you can do pretty well.

Yeah, could I have the broach handle, please? That looks pretty solid, really.

You’re testing its rotational stability?

Yeah, I’m testing rotational stability. It looks good, actually, you know? Do you have the planar once more?

I found when I try to make that stem bigger, as I try and go up sizes, the thing I worry about is a little crack on the calcar region.

Yeah, this guy won’t get that, because he’s--okay, let me have the rondeur.

Yeah, okay. Joel, we’ve got a question here from the audience about the type of stem that you’re using. That is to say, the shape of the stem. Is there something special about this, as opposed to something that’s more cylindrical?

When you’re doing anterior approach, you want to use--could you give me the broach on the--just put a broach on the handle there. Okay, when we’re doing anterior approach it’s preferable to use a broach-only stem, and also to have a stem and broach with some recess in the lateral shoulder here, like the classic (inaudible) is very difficult with the lateral flair. But this is easier through anterior approach. And then something like an AML stem that you ream with long, straight reamers, these are difficult through anterior approach. You can get them in, but then you have to extend the incision proximal, you have to release more from the greater troch like the rotators to get the femur to come up, so you lose some of the advantages of the technique.
So this type stem is preferable, the korai or something like tri-lock, or that type of stem, which is a broach-only stem that you can use also with the offset broach handle. Does that answer it?

Yeah, I think you answered it--yes, you answered it. Good job, well done.

Okay, do you have the broach handle? Okay, so I’ll just check this once more, but it looks good. So we’re going to--what size is this?

It’s a 14.

Okay, let’s go 14. We’re going plus five, standard neck, so that was a good template. And you see a lot of times, when the planar goes down, it doesn’t. It doesn’t go quite flush, plus there’s a little (inaudible) code on the collar, so we’re probably going to actually--this will be about a millimeter and a half longer than the trial will be, which is okay, because we’ve still got about four millimeters difference, three, four millimeters difference between his opposite hip and the trial on this hip.

Now, you know, you did something without telling us. You changed out your posterior retractor.

I did what?

You changed out your posterior retractor. So now you’ve got--it appears that you have an ava retractor on the posterior cortex there. That’s because that planar is a little aggressive, isn’t it?

Yeah, it just gives you--it’s concave here and it gives you a little more room. This retractor gives you more room, so it’s nice to do now. As this goes down, Hamid’s just going to put his thumb near the neck to prevent the stem from anoverting too much, but now it’s good.

I see you’re using an implant with a collar on it.

Yes.

Do you do that every time?

Yes.

Because I know this stem comes with a non-collared variant.

Yeah, it does, but you know, the collar--first of all, the korai has had implants for 25 years, both collar and non-collared, and the results are the same. So the bone doesn’t care if it has a collar or not, so I don’t care. But the thing with the collar is that without the collar, sometimes you can get a little subsidence, and then you’re tempted to try to really get that thing in there tight so it doesn’t subside, and then you have more risk of a calcar fracture. So I think the collar is a little more forgiving, and the 25-year results show it works. So worldwide, the korai with the collar has kind of gradually grown, in relation to the korai without the collar. So here we can see, it’s (inaudible) irrigation. He’s fully (seeded?).

That’s a ceramic head you’ve put on there?

Yeah, that was a delta ceramic head, a 36 head, so we have a--and it’s a plus five, right? Okay, so now we’re going to lower--we’re lowering the hook. I’m going to take the hook out. Now we’re going to take the hook out. Now we’re going to take this out, and can we flex the hip? Now let’s see if we can use the laparoscopic camera here, just a second.

We saw Tina there bring the hip up. Flex the hip up.

Okay, so now we’re going to internally rotate just a little bit, okay?
So you haven’t reduced the hip yet.

No, a little internal rotation. Okay, yeah, she had to go turn on the light source for--

Tina’s running.

There, that’s what she’s doing. Okay, now suction. Okay, so I just want to make sure the astabulum’s clear. So before we reduce it, is there a picture of the astabulum?

Okay, we see that nicely.

Now normally she’s going to be able to easily reduce it. We’re lengthening the leg, so it may not reduce quite as easily, but can you reduce the hip now, Tina? There it goes, goes in. Okay. Show the laparoscopic camera, please. Okay, rotate it, externally rotate it. Okay, internal.

Okay, so we can see--there’s the hip there. So now I don’t routinely--we can get the--what do we have? We’ve got the handheld. Why don’t you move--maybe the two of you move out of the way and I can just stand here.

So I don’t routinely do any stability checks on the hip, because the cuff’s right, the leg length’s right. What do I want to change, you know? You can do this. So unlock the rotation. So I can put the foot--here’s the foot is almost straight out. Looks like about 75 degrees externally rotated. It’s stable. You can actually--at this point, I can flex it extended just so the foot’s free to slide. Lock the rotation, and if you want to, you can unlock the--you can take the foot boot, just unhook it from the table. I can grab the whole leg and move it any way I want, but the question is, what do you do with the information?

So the cuff’s right, the leg length’s right. I just close the wound, and 2,800 primary hips, there’s been four early dislocations. There’s actually been one dislocation in the last 2,000 hips I’ve done, so--and I don’t do stability checks. So I think it’s a waste of time.

When you talk to people who are starting with this technique, and they have had dislocations, are they anterior or posterior dislocations that they worry about?

Most often they’ve had anterior, and I think the biggest issue is cup position, like I said. We’re going to get the x-ray now. If they get the cup too vertical, too anverted, okay, and then they get a dislocation, but still, even with early learning series, like even the Wolson series, where he was trying to point out complications with anterior approach, they didn’t have any dislocations, in almost 300 hips, five different surgeons, and it was their learning curve. So dislocation rate’s very low.

Side to side a little, in and out toward you a little. Unlock the rotation. Lock it. X-ray. Okay, print that. Okay, so we have our prosthesis fully seeded, and we’ll see that it’s a little longer than the other side, than it was pre-op. It’s longer than this side was pre-op, x-ray.

But a little shorter than the other side, still.

Yeah, slightly shorter, yeah. So we probably lengthened about three-quarters of the discrepancy. Okay, print that. There’s our image, going to show the--just where the stem is. We can see the shaft that we don’t have any fractures, but stem, again, appears in a little bit of varus, but very common with the korai. It’ll function very well, it’ll go on and incorporate like that.

Joel, we’ve got a question from the audience before we get ready to start wrapping up, about the likely recovery phase for this patient. In your experience, what is the time to functional recovery for patients that have had an anterior approach, as compared to the posterior approach?

Well, the patients, I just did one guy yesterday, I went up and saw him this morning, and it’s very common to hear the patients, they’ll almost without exception, they’ll say, this is just night and day. It’s completely
different. I've got less pain, I'm moving easier, I'm walking quicker, and the guy did the posterior approach on yesterday in the afternoon, he was going up and down the hall using a crutch, and he didn't--he was on oral medication, not much pain today.

So the typical recovery by itself, for anterior approach, though, is that we’ll allow them to be full weight-bearing, there’s no dislocation precautions. He can move it however he wants, and the most--most people go home the second day after surgery. Some of them go home the day after surgery. Usually by two days after surgery they can do some walking with just a cane in the opposite hand. Usually by a week, ten days after surgery, they can walk around the house shorter distances with just a single cane, and somewhere around two to three weeks after surgery is kind of average for getting rid of external support.

But one thing I tell patients too is that they all ask, how long does it take to recover? Well, they're recovering from surgery, but they're also recovering from the condition they're in prior to surgery, because a lot of them are pretty deconditioned and disabled. So it’s over a period of--usually by about--somewhere over two months after surgery, they start to forget about their hip. They aren't feeling it, they're just using it, and then--but over a number of months after that, even, they can increase their function and regain fitness and muscle function that they lost prior to surgery.

So we’re going to go on with the--and we can get a couple more questions if you want, but we’re going to go on with the closure. It looks pretty dry here now. We’re going to just--usually these are the two sutures. You can go to the jib camera again.

Joel, there’s a question here.

Let me just finish this. These two sutures that are in the anterior capsule--jib camera, please. Yeah, these are going to be tied together, and these are going to--so here's the anterior capsule right here. I think you can see it right here, okay, and that's just doing to lay down right over the anterior hip. We’re going to tie it to the posterior capsule here, and that's going to be all I do to approximate the capsule. You can do a meticulous capsule or closure if you want, but I just get the capsule approximated in the right place so it'll heal. Then we’re going to close the deep fascia with a running layer, subcutaneous, one running layer, and then close the skin. So there’s really no deep repair done, other than just tying these two capsule sutures together.

Oh the question was about--the capsule or repair. So some of the French authors have described capsular excision, and I know when you first started this technique you also excised some of the capsule. Is that wrong?

No, I don’t think so, it’s just a variation in the technique. I mean, you can excise the capsule or you can preserve it. The only thing is that I find if I excise the capsule, I think you get a little bit more bleeding. There’s more cut area. Also, there’s a little more dense open space, so when you put the--leave the capsule in, there tends to be less dead space, less open space for hematoma to run into, and I think that’s a little bit of help afterwards.

But you know, I mean, I wouldn’t make a big argument out of excising. Sometimes you get cases like let’s say you have a dysplasia or a perthes where you really change the biomechanics so much, you lengthen the neck in that, then maybe the capsule doesn’t really come back where it was before so easily.

So this surgery, you picked this patient as the patient for the OR Live experience, because it was a little bit more difficult than some of the other cases. Our broadcast went a little over an hour. I’m not exactly sure how much over it went, but what is your typical time for a surgery, and was this significantly different?

Well, usually the components are in. We have them in a little under an hour, somewhere around 50 minutes. The average surgery time for skin to skin is about 1.2 hours.
Okay, well I think we haven’t gotten any recent questions since the capsular question, so I think we’ll thank our viewers for tuning in. Dr. Madda, thank you so much, it was wonderful, and that was a very nicely done anterior approach total hip surgery.

Okay, I think the whole team here and film crew did a great job, and thank you, Tanya.

Thank you, Joel.

END