

SPEAKER 1: This is the other end of the spectrum, again, for degenerative arthritis of the knee. And, again, I have no financial relationships to disclose. And I will not discuss any off-label investigational products in this talk. So an overview, we'll talk about evaluating your patient with a painful knee, similar to the last talk. Some radiographic evaluations, some treatment algorithms, when to refer your patients for a knee replacement, and some of the anesthetic choices.

Some of this will be sort of similar to the last talk in terms of anesthetic choices, you'll see sort of common themes. And the expected post-operative timeline for knee replacement, which is a little bit longer than hip replacement. And some commonly asked questions and some advances with MIS surgery and some new technologies.

So when you evaluate your patient, you've got to figure out what is the chief complaint, the location of the pain, again. Someone can say they have knee pain but the problem is from the hip. So you've got to really think about, is their pain that is referred from the hip down to knee. Some trochanteric bursitis pain can radiate down the lateral thigh towards the knee. You've got to think that as well and keep that in mind.

Again, be wary of the patient who has, I have knee pain but you have normal knee x-rays. You've got to think about the hip in those patients. In the knee, oftentimes the pain is in the joint line. So you'll find tenderness along the joint line when you palpate these patients. Anterior pain in these patients often is due to patella femoral. And we see that a lot in women who have sort of a more valgus alignment of their knee.

Patients who have meniscal tears will often have acute pain and swelling in the knee. So if there's an acute tear you'll get this large effusion and pain in the knee, and a positive McMurray sign in those patients. So you've got to figure out is the pain acute or chronic? Obviously, if it's an acute issue you've got to think about a tear or some sort of traumatic event. Usually arthritic pain is more chronic and indolent and worse with activity. And there are waxes and wanes depending on their activity level.

There are certain exacerbating activities that can lead to that. Oftentimes, patients with advanced arthritis can complain of giving away episodes or instability. So when you have an 80-year-old patient, or 70-year-old patient, who has instability. More often than that that's probably due to pain that's originating from the joint that then shuts down their quadriceps through a spinal reflex, then they kind of have giving away episodes. And they can fall, too, in these patients. And I see that a lot in patients who fall because of arthritic type pain.

They can get some mechanical locking symptoms. So there are loose bodies in there that can lock. And they say, oh my knee was stuck for awhile and then they moved it and it loosen up. That's often from potentially some loose bodies floating around in the joint. And often, these patients who have pain that affects their work or recreational activities. So think about those patients as well.

Back pain or radicular symptoms, think spinal stenosis. So if they give you that story of pain where they are walking, or standing, and then they sit down and it goes away, think radicular symptoms, and not from arthritic pain, whether it's from the hip or the knee.

History of trauma. So patients who had an ACL tear, for example, or a meniscal tear in the past are high risk for arthritis later on. And fracture patients, particularly intra-articular fractures can have early onset arthritis. So when you are examining these patients, I think it's important to have them wear shorts, because you've got to see the skin, you've got to see the knee, and evaluate thoroughly that way. Trying to slide up a pair of pants to examine a knee is hard, I think, because it bunches up above the patella, it's hard to examine the knee because that in itself will limit their range of motion.

So you want to assess their active and passive range of motion. Look for an effusion in the joint. Look for joint line tenderness, so McMurray sign. You saw this earlier in some of the sports lectures early in the week. Is sort of suggestive of a meniscal tear. Now, if someone has a bad end stage arthritis, they're going to have a positive McMurray sign because you're just grinding their articular cartilage against each other. So think about that when you have someone with advance arthritis.

A Lachman test for an ACL deficient knee in a younger person. A posterior drawer test if you think of a PCL injury. And then think about medial and lateral retinacular pain in patients who have patellofemoral arthritis. So you get an x-ray, the joint space is relatively preserved between the tibia and the femur, but if you get a skyline view, or a lateral, you see some arthritic changes in the patellofemoral joint. Those patients can have retinacular pain just on the medial and lateral facet of the patella.

So you kind of palpate along the edges the patella. They'll have tenderness there. And that suggests patellofemoral joint. And those patients will give you a story of, I have pain when I'm going to the movie theater and my knees against the seat in front of me, or going downhill, or kneeling. Those are sort of classic for patellofemoral arthritis. And that can be challenging to treat sometimes in that patient group.

Palpate other areas of tenderness. You've got to rule out any tendinitis, or bursitis type symptoms. So IT band can have insertional tendinitis down to Gerdy's tubercle on the proximal tibia. Patients can have pain there as well. Pes tenderness, so that pes anserine inserting on the medial side of the knee. That's a little bit further down the joint line but patients can have pain there too. And that can kind of mislead you and think that it's arthritic symptoms. So it's not really the joint line, it's well below the joint line. So you've got to think about that.

Palpate for a Baker's cyst. And that's often a sign of other problems going on, meniscal tear, or degenerative arthritis, or other sort of inflammatory process that's leading to a lot of fluid accumulation in the knee.

In terms of imaging studies, this is where it's important to get, just like it was highlighted on the hip side, to get standing films. You really can't appreciate deformities unless you get a standing AP of the knee. So on the left side of the screen is a non-weight bearing film. On the right side of the screen is a weight bearing film. You can really appreciate the valgus deformity of that patients knee there. So a standing film makes a difference, I believe, for knees.

And then I usually get a lateral view and a skyline view. And that's really all I need for my purposes in terms of patients with arthritis in the knee, whether it's inflammatory, or degenerative.

So for the most part radiographs are sufficient. I think that axial images, meaning CTs and MRIs, are really not necessary unless you suspect a lesion, or in a younger patient you suspect a tear, a meniscal tear or an ACL tear. So that's where an MRI is more helpful. But in patients with advanced arthritis, whether it's osteoarthritis or rheumatoid arthritis, don't get an MRI because I think that would just be a waste of the patient's time, money, and resources. Because the x-ray, in itself, would be sufficient.

If you see someone with bone-on-bone disease an MRI is really not helpful. Because it really won't give you any more information. It won't really change your treatment algorithm in these patients. So the differential diagnosis includes osteoarthritis arthritis, or inflammatory arthritis. You've got to think about hip arthritis, again, referred pain down to the knee originating from the hip. That's always on the back of your mind. Think of spinal pathology, patients with spinal stenosis or herniated discs, whether it's an upright position that produces their pain, and sits down and it goes away, that's spinal stenosis.

If they're sitting or driving and they get pain, that's more of a herniated disc type symptom. Think of vascular disease, so claudication, can sort of mask, sort of vague calf pain, that you may think maybe coming from the knee. Patellofemoral disease, so again, anterior knee pain is sort of the classic sign for patellofemoral disease. Bursitis, whether it's insertional IT band tendinitis, or pes bursitis, think about that.

And then sometimes we get osteonecrosis of the knee, spontaneous osteonecrosis of the knee, or SONK, that can be acutely painful in these patients. Now those patients usually you get x-rays, and it's not very impressive, and you're kind of figuring out what's going on. An MRI may be helpful in that situation. And that's where you see this intense edema in those patients, with a period of protective weight bearing, and anti-inflammatory. Those kind of go away. Stress fractures can mask as knee pain too. If you have a runner who has pain down the shin, you've got to think about a stress fracture.

Patellofemoral disease is always, almost always, in the anterior aspect of the knee. It's a malalignment issue and it has to do with patella tracking. So in valgus deformities where there's lateral tracking of the patella, that can cause patellofemoral disease. Oftentimes, as I mentioned earlier, the patients are tender along the medial and lateral facet of the patella along that retinaculum. And that's where it's very specific to patellofemoral disease, so you've got to palpate that area and see if that's a source of their pain.

They can get patella crepitus, when you take them through a range of motion, you put your hand, I put my palm on the patella as I go through range of motion and you can feel that crunching anteriorly, and that's indicative of patellofemoral disease. And the treatment for this is physical therapy with VMO strengthening to help pull that patella medially. Sometimes a patella stabilizing sleeve can help, but it doesn't solve the problem. It just helps align the kneecap, but once that sleeve comes off, it's going to track laterally again. So physical therapy is probably the most important part of it. And then surgery as a last resort if the therapy does not help.

In terms of IT band and pes bursitis, so it's usually painful directly where the insertion of the IT band or the pes insertion is. So you put your finger in there and it's below the joint line, those patients are tender. And so oftentimes a steroid injection in that area would help. So the pes comprises of the sartorius, gracilis, and semitendinosus and that inserts on the medial flare of the tibia as it goes down from the joint. And so patients are tender in that area.

And that's where you may consider an injection. Anti-inflammatory, some physical therapy, to help stretch the hamstrings will help. Sometimes ultrasound can help and iontophoresis can help in those patients. And really, there's no good surgery solution for pes or even IT band insertional tendinitis, I think. It's really modalities and physical therapy for those patients.

Baker's cysts, oftentimes it's filled with fluid in the back of the knee. And it's from other problems such as a meniscal tear or advanced arthritis that's causing a lot of synovial fluid accumulation and it comes out the back of the joint. It can mimic a DVT and they can rupture. And you'll get this tense calf, and you'll think, oh this patient has a DVT. And they can be very painful. And the treatment for these patients is to treat the underlying problem. So if it's arthritis then a steroid injection will help, anti-inflammatories. You can aspirate it, but more often than that it'll come back. And really, surgical removal of a Baker's cyst is not, I don't think, a good solution, because it will just recur. It really doesn't treat the underlying problem, which is the arthritis or meniscal tear, or some other intra-articular pathology that's leading to this accumulation of the joint fluid.

So radiographs and findings for osteoarthritis, again, just like on the hip side you get joint space narrowing, sub-condyle sclerosis, osteophyte formation, and sub-condyle cysts as we talked about earlier. And again, the same grading system as it is for the hip for grading hip or knee arthritis. In terms of rheumatoid arthritis and inflammatory arthritis you see more of a symmetric appearance of bilateral extremities are affected. So both knees are affected. You get symmetric joint space narrowing.

Whereas in the other picture you can see it's asymmetric. Right, you see, that this here has more lateral compartment disease there, and a valgus deformity. Whereas this one, there's not significant deformity and you get this symmetric loss of the joint space. And that's classic for inflammatory or rheumatoid arthritis. And you get these patients will complain of hand pain or her hip pain, as well. And so think about that when you see patients with symmetric joint space loss in the knee.

So treatment algorithm, not operative treatment for the knee. Weight reduction, again, the amount of force that goes across the kneecap is about 3.5 times your body weight. So just losing 10 pounds is significant for these patients. Particularly if they have patellofemoral disease because that makes a big difference, just offloading 3.5 times your body force is significant and can modify their pain quite a bit.

Activity modification, low impact exercises such as swimming I think is good. Again, an assistive device such as a cane can be helpful, or a walker in the elderly. And again, avoid a wheelchair because if you put the person in a wheelchair, almost guarantee they'll get a flexion contracture in their knee because they'll stay with their knee flexed, they'll get a flexion contracture of their hip and a flexion contracture of their knee, and then when they try to get up they'll walk at a crouched gait and it just spirals downhill thereafter. So really avoid that if you can.

The treatment is anti-inflammatories, anti-inflammatories, and anti-inflammatories. That's the gold standard for knee arthritis. In terms of glucosamine and chondroitin, the benefit is uncertain and it's controversial whether it makes a big difference. Obviously, the downside is the cost to the patient. Typically each of those bottles is about \$30 a month each for the patient. So you've got to think about that in terms of the economics for your patients when you're suggesting that they take these.

Physical therapy can make symptoms worse with advanced arthritis. And so, just like on the hip side, if it's mild arthritis you could strengthen the quads and the muscles around the knee to help support the knee. But with advanced arthritis oftentimes physical therapy can make things worse. Bracing, if there's a deformity an unloading brace can help. But again, that's expensive for the patient because you may have some issues with insurance companies paying for unloading braces for your patients.

I think the steroid injection is very helpful for these patients as your first line treatment for arthritis of the knee. I do this in a sitting position. Or you can do it in a supine position. And I usually use the lateral portal to the knee. I use two CCs of bupivacaine, two CCs of lidocaine, and one CC of kenalog-40. And usually that will give you three months, or longer. Sometimes it's a shorter time period, sometimes it's a longer time period. And it really depends on the severity of the patients' arthritis. I limit it to three or four injections a year. So every three to four months is the most I would give an injection for a patient. And there's really no proven benefit for viscosupplementation for advanced arthritis. Maybe there may be a role for early arthritis, I think in the older patient who has advanced arthritis, I don't think that will help him or her significantly.

There are some potential downsides to this. In rare situations you can get pseudosepsis where a patient may have an allergic reaction it looks like an infection, but it's just an allergic reaction to the agent. In terms of the role for arthroscopic debridement in degenerative knees, there's no proven benefit. And this is a great study out of the VA that looked at arthroscopic lavage for patients with arthritis. And they randomized patients to lavage and no lavage and debridement, and both went to surgery, one had sham surgery, the other one didn't. And the outcome was the same for both groups. So the role for that is very limited in patients with advanced arthritis in terms arthroscopy.

In terms of nonoperative treatment, when it fails, that's when you would, obviously, refer the patient to an orthopedic surgeon to be considered for joint replacement if they have findings for advanced arthritis. And there are a few surgical options depending on where the arthritis is and how advanced the disease is. So in terms of non-arthroplasty options, you could have realignment osteotomy. So if someone has isolated medial compartment arthritis, you could do the realignment osteotomy to help off-load that medial compartment and distribute the force. That's not a solution, but it may buy them 7 to 12 years in these patients.

Knee fusion is very rare that we do these now. It's very uncommon to have that. But historically, some people get knee fusions for advanced arthritis. A partial knee replacement is an option. That's really just in the medial compartment of the knee, or lateral compartment. Bicompartiment is replacing, oftentimes, the medial compartment and the patellofemoral joint. And then the third is a total knee replacement.

So this is a realignment osteotomy. This is a patient who had lymphoma, ignore the femur because he had radiation to his femur for lymphoma. But he had medial compartment arthritis. And this was done 15 years ago. And it bought him 15 years. You take a wedge out of the lateral tibia, realign that-- because most of the force was going through the medial compartment of his knee, and it bought him 15 years. And I would say that's a success. Now granted, converting that to a total knee arthroplasty is more challenging, and I did that in this person. But I would say that procedure is a success in this person because he was 45 at that time. And so I would say that's appropriate in that setting.

Again it corrects a valgus or varus deformity, depending on where the disease is primarily. And it buys somewhere between 5 to 10 years, maybe longer in some patients, of time before converting to a total knee arthroplasty. And it is more challenging to convert this to a total knee arthroplasty, that's certain.

Other options, if someone's maybe a little bit older you may consider a partial knee replacement, where you just replace the medial compartment, if the arthritis is in the medial compartment. So this patient here on the top is pre-operative x-rays showing medial compartment arthritis. And she had a partial knee replacement and is very happy.

Now there's the potential risk for her getting arthritis in the lateral compartment and patellofemoral joint later on. But converting that to a total knee is fairly straightforward and could be done relatively quickly. It's really indicated in patients who doesn't have a significant deformity. And really truly isolated medial compartment disease. Because if they say, oh I have pain out here, and maybe in front of the knee cap, that's not the right patient because they will continue to have pain in those areas and it will get worse and they'll be unhappy with you.

And so, you really have to have-- I call it the one-finger sign. They have to point to one spot where it hurts them. And it has to be the medial compartment before I would do a unicompartiment knee replacement in that patient. Again, if someone's overweight, it's a relatively contraindication for a partial knee replacement.

There's a bicompartiment knee replacement. This is a little controversial and the longevity on this type of replacement is not as great as a partial knee or total knee. But in patients who have isolated medial compartment and patellofemoral disease a bicompartiment is an option as well. With some advances, robotic surgery now, I think we could put these devices in more precise manner so that-- the issues historically is a lot of these failures occurred because we weren't putting them in the right alignment, or we're taking too much bone, or too little bone, and the implant is more prominent. I'm seeing that, too, when someone has a device like this, and it's prominent and the kneecap keeps riding on it, and the patellar component came off.

And so this patient came to me with the loose patellar component because it was just hitting the femoral component as he was going through his range of motion. And so, that's where the technical part of this is important, and that's where robotic surgery may have a role in trying to put these implants in a more precise manner. So that's very exciting in the forefront in terms of partial knee replacements.

And then the last option is a total knee arthroplasty. And this is the gold standard, has the longest history. It's a tried and true procedure and has very reliable outcomes. And in older patients has excellent outcome-- even in younger patients they do very well. And this is where you have to really have a thoughtful discussion with your younger patients. If they have a total knee arthroplasty they may need additional procedures, if they're in their '40s they may need something later on when they're in their '60s, or in their '70s, potentially, if there's wear issues.

And so historically, totally knee arthroplasty began in the 1960s. And this is what it looked like, it was a metal on metal knee, it was a hinge essentially. And, obviously, there were lots of issues with metallurgy, metal debris in the joint, and that failed quickly, and that was abandoned. And lots of early failures, infection, loosening, metal synovitis, because you get this black joint now, and the synovium is just inflamed and painful. So with some of the success on the hip side, where there was metal on polyethylene, then that transition to metal on polyethylene on the knee side. And that's really the standard now is a femoral component, and then a polyethylene spacer in between, and then a tibular component.

Oftentimes, it's cobalt chrome on the femoral side and titanium on the tibial side. Now some patients who have metal allergy, where there's nickel and cobalt issues, that's really the culprit for metal allergy, then we will use a non-nickel or cobalt containing implant for those patients. And it's a very successful procedure for these patients.

In terms of the decision making for a total knee arthroplasty. And, again, just like on the hip side, this is an important role for the primary care physician to have a thoughtful discussion with your patient about when is the right time. And really pain is the most important indication. It's an elective procedure. The best time is when the pain affects the patient's quality of life. And the patient has to decide it's the right time for him or her to do it. Keep in mind, again, just like on the hip side, preoperative function scores correlate with postoperative scores in these patients.

So if someone has been pushing off a knee replacement for five years and is getting more and more contracted, their range of motion is going to be less after surgery. If you're starting with 90 degrees of flexion, it's going to be more challenging for the patient to get to 125 degrees or 130 degrees postoperatively. Because the quad tendon hasn't seen that much stretch in five years, now you're asking it to stretch all the way back as the knee goes into flexion. So that's where you have to talk to your patients and say, maybe this is the right time for a knee replacement. But again, it's a two-way conversation with these patients.

The outcomes for a knee replacement is very good. It really changes the patient's quality of life. High patient satisfaction, just like on the hip side. Not as high as the hip, but still very, very successful, 85% to 95% plus success rate in these patients. And there are studies that go up 15 years, for example, here with 90% success rate and excellent to good results in these patients who've had knee replacement. So it's a very predictable procedure with very good outcomes.

Just like on the hip side in terms of preoperative evaluations, I have all my patients see the dentist preoperatively, have them see the anesthesiologist, routine labs, ASA stratification in terms of the anesthetic risk, cardiology evaluation if there's a cardiac issue, and a single visit with the physical therapist to get any assistive devices that they may need early on after surgery. And then teach expectations for these patients in terms of what exercises they're going to be doing. Because that's more important for the knee than the hip. Physical therapy is absolutely critical, because you have this three month window to get maximum motion for a total knee arthroplasty. Whereas the hip, just the patient walking by him or herself is good therapy in itself. But the knee, you really need someone to push on that knee to maximize your range of motion, so that's very important.

I talked about this earlier so I'm going to just skip through this quickly, in terms of the anesthetic choices. Again, just like on the hip side everyone gets a spinal epidural for the most part. The exception is on the knee side they can get a peripheral nerve block, so they can get a femoral sciatic nerve block, and that gives them about 24 hours, maybe 36, and sometimes 48 hours of pain relief. The downside is that they have no motor functions. It's very hard for them to get up and control their limb because they have a limp leg. So in those patients you have to put on a knee-mobilizer so they don't fall. Again, a general anesthetic is an option too, but I really don't do that.

The same post-operative care as on the hip side. Again, physical therapy is very important. They start walking in the recovery room two to four hours after their surgery, to get them moving right away, and that's absolutely critical. Same DVT prophylaxis, as I talked about on the hip side. Again, my practice is epidurals for total knees. Peripheral nerve blocks in some patients if they can't get an epidural for some reason, if they had spinal procedures, or other issues that may preclude them from getting a neural axial block, then they would get a peripheral nerve block.

And then Coumadin starting the morning of surgery and continue for three weeks. Unlike the hip, the recovery for a knee is little bit longer. So it takes about 12 to 18 months to really fully recover from a knee replacement. Whereas on the hip side, we're talking about six to eight weeks. A knee replacement is a little bit longer and has to do with the quadriceps shutting down and atrophying and it takes a year for the quadriceps to come back. And in the first year the patient can get periodic swelling in that knee, vague discomfort, and vague quad weakness. And so that's where therapy is very importantly, they need to continue doing those exercises.

But again, we do very early ambulation, getting up and moving right away. On the knees, usually go home on day two, whereas the hip go home the next day. And if their Medicare patients who need to go to rehab, they have to stay three nights and they would go home on the third day.

Commonly asked questions, just like on the hip side, when can I return to work? Usually for a sedentary type job four to six weeks. Now I've had people go back the next week, and that's a rare exception. But for the vast majority of patients four to eight weeks is that time frame for returning to work for a knee replacement. For an active type job, usually about three months is typical.

In terms of driving, so here's a study that looked at patients who returned to driving after surgery. Now granted this study was through a traditional total knee arthroplasty, with less invasive approaches it's probably a little bit quicker now, but for a hip replacement was eight weeks. And it varies between the left or the right. I would say that's pretty unusual. Most of my patients now for the hip, whether it's operative side or contralateral side are driving in four to six weeks for the most part. Unless they're elderly and don't have the motor control as a younger person. The left knee is four to six weeks and the right knee is six to eight weeks. Again, these are data from 1998.

So other commonly questions, just like on the hip side. On the knee side it's a little bit higher in terms of resuming sexual activities, 55% in one to two months. And same for men and women in terms of position and everything. When can I resume sports? Usually more than six weeks for on the knee side. For golf or doubles tennis, for more active activities, about three months or so. Biking, as soon as you get on a bike. Stationary bike is very good because it gets the knee moving. And then regular bike whenever the patient feels like they're confident enough to do it. Swimming is good. As soon as the incision is healed, I say go swimming. Because it's good for you, good for the needs.

In terms of a dental prophylaxis, just like on the hip side, again it's controversial but I still recommend it, I use amoxicillin 30 to 60 minutes prior to procedure and Clindamycin if their penicillin allergic.

And then what about the female knee that we heard about a few years ago. There's no proven improved outcome with this device. And in fact, it was a really a marketing campaign by the implant company for that female gender specific knee. Now implant companies have a wide variety of sizes that will fit the patients appropriately. So that has gone by the wayside.

MIS surgery, minimally invasive surgery, our incisions are smaller. We can do it through a small incision because our instrumentations are better. So here's a patient that had a left knee done, I think, 10 or 15 years ago. And I did her right knee about six years ago. And she took this picture and sent it to me. She spent some time in France, and sent this picture from France. And she was ecstatic because her incision is a lot smaller than the other side.

Now when you look at the data, just like on the hip side, the difference is relatively short term, but long term it makes no difference in terms of outcome. But patients are happier because incisions are smaller. And they're recovery and the quad strength probably gets back a little bit faster than in our traditional approach in the past.

MIS surgeries, again the gain is relatively short term. Better function and better scores early, but by six weeks, three months, and one year, the difference is probably less and less with time. But again, cosmesis is important for the patient because they like the smaller incision.

So in summary, you have to exhaust non-operative measures for these patients with knee arthritis. There many surgical options ranging from osteotomy, to partial knee replacements, to total knee replacements. It's important to have expectations for your patients. It's important to remember that the recovery for a knee replacement is a little bit longer than a total hip arthroplasty.

We're doing more these. It's expected to be somewhere between 1.1 million to 1.5 million by 2015. So that's a lot of knee replacements. A knee replacement is a good option, just like on the hip side. It's a reproducible and reliable procedure. The outcomes and long term outcomes have been proven and it helps improve quality of life for these patients.

Our recovery for these patients are faster now that we have a better anaesthetic, we're more aggressive with physical therapy, we're getting up and moving right away, and through less invasive procedure. When the time to refer a patient for knee replacement is when really the pain affects their quality of life.

And again, just keep in mind that their preoperative functions is a predictor of their post-operative function. So again, same websites in terms of resources for your patients, and thank you very much.