

**SPEAKER 1:** I'm going to talk about the other end of the spectrum when the hip gets to the point where all we have left is arthroplasty options. I have no financial disclosures, and I will not discuss any off-label or investigational products in this presentation.

So the overview of this talk, I'm going to talk about evaluating a patient with a painful hip. We're going to talk about some basic greater graphic evaluations, and that was highlighted in the last couple of talks. Some of the treatment algorithms that we have degenerative arthritis of the hip, and when it's appropriate to refer the patient for a hip replacement or a joint replacement, some of the anesthetic choices we have for patients with hip arthroplasties.

And I think we've made tremendous advances in this in terms of pain control for our patients, and then some of the expected post-operative timeline for our patients. When can they start driving again? When can they get back to their normal activities? And some of the hot topics that you've heard about and patients have asked you about hip replacement, such as minimum invasive surgery, some new technology, and this sort of relatively new direct anterior approach to the hip.

So in terms of evaluating a patient with hip pain, obviously the history and physical is very important. Hip pain typically is pain in the groin region, and sometimes it can be referred down to the thigh, the buttock region, and sometimes down to the knee as well. Beware of lateral hip pain, and that was highlighted in the last talk with trochanteric bursitis.

When someone points to the lateral side of the hip, that is not from the joint. That's often from trochanteric bursitis. And you can be misled in patients who may have some mild arthritic changes in the hip, and they're tender laterally, that's not the major source of their pain. The major source of their pain is trochanteric bursitis, and that can be treated with injections and therapy.

Anterior pain, anterior thigh pain and sometimes knee pain is referred from the hip. So you really have to think about that. I've had patients who come in convinced that they need a knee replacement, and you get a knee x-ray, and it's relatively benign. And you get a hip x-ray, and they have end stage changes. So you really have to think about that and those patients who have distal thigh pain that says, my knee hurts, and think about the hip when the x-ray is normal.

Lumbar pathology can also refer to the hip, and when someone gives you the story that when they walk or are standing, and they have tremendous pain in their groin region, they sit down and it goes away instantly, you think about the spine and not from the hip. So that's very important to consider as well. As we just mentioned about the sitting versus standing, spinal stenosis is almost always in a standing position. When patients have hip arthritis, they will have pain at rest. They will have pain when they're sitting, and that's much different from spinal stenosis.

You also need to get a history whether the patient has a history of hip dysplasia, because those patients are prone to developing hip arthritis earlier, so patients who have significant dysplasia can just start to get arthritic pain in their 30s, 40s, and 50s, so something to keep in mind.

History of trauma, so any fracture or dislocation can be a predisposing factor for developing hip arthritis. And those patients who had a history of a slip capital terminal [INAUDIBLE], so a teenager who says they had hip pain when they were 10 or 12, and then later on in adult life start to get hip pain in their 30s and 40s, you have to think about that, and that may be the ideology for their early onset arthritis.

In terms of the history and the physical examination, that was, again, highlighted earlier. Really, you want to assess the range of motion of the patient-- flexion, extension, abduction, and really the most important maneuver is flexion and internal rotation, because that's the position that causes most pain in patients with hip arthritis. So flexion, abduction, internal rotation reproduces the pain they have. If you make that maneuver, and they say, that's the pain that I get, Doc, that's really the ideology of the pain.

You also have to assess their flexion contractures, because patients who have arthritis, want to keep their hips slightly flexed, and so the capsule can get very tight. So they have begun to lose range of motion as they get contractures. Look for a Trendelenburg gait weakness in their gluteus medius. And obviously, we talked about earlier, trochanteric bursitis is much separate than from hip arthritis.

So for trochanteric bursitis, it's pain and tenderness over the trochanteric bursa. And it can radiate distally along the IT band, along the lateral thigh. It may be acute or chronic, and typically it's worse when they're sitting or rising from a seated position. And oftentimes, it's worse in the first few steps. They can have night pain, and then oftentimes it's worse when they're laying on that side.

And they can have some lateral sided pain with external-internal rotation of the hip. They can have some lateral point tenderness on the examination, and when you get an x-ray, the hip x-ray's relatively benign. There's very little arthritic changes in the acetabulum or in the femoral head. You get to think about trochanteric bursitis.

Other studies are really not helpful. MRIs, bone scans-- not very helpful with trochanteric bursitis. This is treated with physical therapy and an injection if needed. So when I order x-rays for hip arthritis, I get an AP pelvis and an AP and lateral hip. So in the center is an AP pelvis, and then an AP hip on the left side of the screen, and then a lateral on the right side.

And really, that's all I need for, in terms of valuing a patient for hip arthritis. Obviously, if there's lumbar pathology, I would get lumbar x-rays. If I think there's pain in the knee, then we would get knee x-rays. But these three images are probably the most useful images for evaluating and treating patients with degenerative arthritis of the hip.

Some of my additional studies, really for the most part, those x-rays are all you need. In rare cases where you suspect osteo necrosis when the x-rays are relatively benign, or you may see some sclerosis, and you think about AVN, and an MRI in that setting is helpful. You also get an MRI. You think there's a lesion. You see something concerning on the x-ray-- there's a lucency, then that's where you would go and get an MRI.

MRI for end stage arthritis or rheumatoid arthritis is really not helpful, and I think it's really a waste of our resources if we get those. So what are the radiographic findings for hip arthritis? So there are four classic signs.

Number one is joint space narrowing. So when you lose the articular thickness, and so your joint space gets narrow. Two is subchondral sclerosis, so you can see that white band underneath the subchondral region. That a dead giveaway for arthritis. And three is subchondral cysts, so you get loosened lesions in the acetabulum sometimes in the femoral head.

So in this case, you can see cystic changes both in the acetabulum as well as in the femoral head. And then number four is osteophytes, and oftentimes, these can be large, large bone spurs that you can see here, that can cause impingement and block motion, and can be very painful for these patients.

And we have a grading system for arthritis. And it really, again, highlights those findings. You look for joint space narrowing. You look for bone spurs, sclerosis, and eventually deformity. And it goes from one to four in the Kellgren and Lawrence grading system for hip, as well as knee arthritis.

In terms of osteonecrosis, and we see this often too, patients who have a relatively normal looking x-ray, if you have early stages of AVN, the x-rays are very, very benign. And you really don't find much on that x-ray. When you get an MRI, you see this certain, edematous, femoral head from neck as shown in this MRI here.

And that's a classic example of osteonecrosis. OK. So you have to think about that when someone has groin pains, and your x-rays are relatively benign, and they have risk factors. For example, they are a sickle cell patient, or they've been on steroids, or they've drank a lot. You've got to think about those things in those patients for AVN.

Again, risk factors-- steroid exposure, alcohol, sickle cell, coagulation disorder. So someone with lupus, for example, with anti-phospholipid syndrome-- very high risk for AVN. Interestingly, HIV antiretroviral medication has been associated with AVN, and then any history of trauma. When someone has a dislocation of their hip, because all the blood vessels that supply the femoral head run along the femoral neck.

And when you dislocate your hip, those vessels are torn, and now you have what we call a dead head. And likewise, when you have a fracture through the femoral neck, that tears those vessels as well and puts you at risk for osteonecrosis of the femoral head.

And then just like we have a grading system for osteoarthritis, we have the grading system for osteonecrosis, and it goes from normal on radiographic findings to some cirrhosis and cystic changes to subchondral collapse, and eventually arthritic changes in both the acetabular as well as the femoral side.

Rheumatoid arthritis is a lot different than osteoarthritis in that you often get symmetric findings in both hips and other joints as well. And one of the sort of hallmarks for inflammatory arthritis is what we call acetabular protrusio. So you can see here, you can see the femoral head sort of migrating towards inside the pelvis.

And that's a classic example of the acetabular protrusio. When that head migrates immediately, you got to think about inflammatory arthritis and less likely to be osteoarthritis. Sometimes we see that with osteoarthritis, but for the most part, that's almost always a dead giveaway that it's an inflammatory process. So you've got to think about other joints, as well, and maybe send this patient to see a rheumatologist.

In terms of the treatment for trochanteric bursitis, anti-inflammatories, activity modification, physical therapy, and injections. That's the hallmark. And trochanteric bursitis is, I think, a very difficult problem to treat, because oftentimes it can be recurrent. And you try a few injections, and they continue to have pain. That's when you may refer them for a possible arthroscopy and release of the IT band and debris of the trochanteric bursa.

So to do this injection, you lay the patient in the lateral decubitus position. Basically, you palpate the area of maximal tenderness, and inject in that area. You go down to the bone, pull back a few millimeters, and inject that bursa. And I use the marking two cc of lidocaine and one cc of Kenalog-40. And oftentimes that helps them, but the injection just settles things down, but the more important thing is the physical therapy, I think. Because that's what keeps it from coming back.

So you can do an injection, but you've got to really encourage the patient to do physical therapy. Even though they'll feel better for their first week or so, unless they do the therapy and stretch that band out, it's going to recur. So it's very important to do that. In terms of the hip arthritis, nonoperative treatment, obviously weight reduction is helpful. So they're junk reactive force across the hip is about two to three times your body weight. So if you lose 10 or 15 pounds, it makes a big difference for these patients.

Activity modification, low impact exercise is good. So swimming, I think, is great. An assistive device may help. A cane in the contralateral hand will help them quite a bit. In some patients a walker, and obviously I discourage-- try to avoid wheelchairs. Because once you get in a wheelchair, you start to get contractures, so the hip stays flexed all the time, and you get that contracture in the anterior capsule, and then it's sort of a downward spiral. So I really, really discourage that, if possible.

We talked about low impact exercises. So it can have some benefits, but be worried about aggressive physical therapy in these patients. So there's a recent JAMA article that talked about physical therapy in hip arthritis, and oftentimes it made the symptoms worse and really doesn't help the patient, so I think it's good to have low impact exercises, but aggressive physical therapy in the setting of advanced hip arthritis may not be so beneficial in these patients.

The hallmark to a nonoperative treatment as you all know is anti-inflammatories, and obviously it depends on whether the patients can tolerate anti-inflammatories, but that's really the most important treatment for hip arthritis. And intra-articular hip injection can help, and it's a short-term relief. So some patients can get three months relief, six months relief, and I've had patients who had a year relief with a single steroid injection into the hip. This can be done under fluoroscopic guidance, so under ultrasound. Both methods are fine. Ultrasound is nice, because it's convenient, it's quicker, it's probably less expensive.

In terms of hyaluronic acid or Synvisc injections into the hip, I really see no significant benefit in these patients, and it's not FDA approved as it is in the knee. So if a patient has failed nonoperative treatment, then that's the point where you would consider referring the patient for a hip replacement. Obviously this is an elective procedure, and it's dictated by how much the pain affects the patient's quality of life.

Oftentimes, a lot of patients tell me afterwards they wish they had done it sooner, because they prolonged it, and they were afraid of a hip replacement, and afterwards they regret they haven't done it sooner, and more often than that, when they have symptoms on the other side, they're quicker to come back and have the other side done. So it's a very rewarding procedure.

In terms of what other options we have prior to the hip replacement, an osteotomy. So it's indicated in young patients with early arthritis where you could realign the joint potentially and take off, or unload the area that is arthritic and painful. I would say that's a pretty rare procedure. Hip fusion is another option, but again, that's pretty rare.

We rarely do that nowadays, particularly with the longevity of the implants we have now. Even in younger patients, we're doing hip replacements, and patients even in their 20s and 30s with severe hip dysplasia, and that's because of the implant technology that we have that can have significant longevity.

So the indication is pain, pain, and pain. That's probably the most important thing, and obviously if the pain affects their quality of life. In terms of contraindications for hip replacements, so if someone has a systemic infection or a history of chronic infections, I really am leery to proceed with the hip replacement in those patients, because once you get a periprosthetic infection, that's a disaster.

And that leads to multiple surgeries, and potentially possibly to not having a hip, where you have a flail hip. If you can't reimplant, because there's chronic infections, then the patient would have what we call girdle stone, which is no hip, essentially.

Any history of local infections. I really want to make sure there's no evidence of infection. So if someone had a septic hip in the past, I'm leery of those patients unless I have obvious signs, there's no signs of infection. That was in the distant, distant past. The CRP is normal. Everything else is normal to suggest that there's no active infection. Our charcoal joint. So if there's a neurologic reason to a degeneration of the joint, you should not do a hip replacement, because that will fail and will loosen relatively quickly. OK.

Comorbidity, certain comorbidities will exclude you from getting a hip replacement. And this is where you have to evaluate some sort of pre-operative risk factors.

So hip replacements have been around for a long time. We've been doing this since the 1960s. The first was done in England by Sir Charnely, and it was called a low friction arthroplasty. And at that time, it was just a cemented acetabular component, which is polyethylene, and then a cemented femoral component. And to do the hip, they would cut the trochanter off, and then do the hip replacement, and wire it back together, and then have their patient start to ambulate.

There was a lot of complications with these early arthroplasties, and it was really indicated for patients who were so crippled by their disease that there was no other alternative, and some of the complications include infection, dislocation, and loosening of the components. So it was really for patients who were so affected by their pain that they're disabled, that not having a hip was an option. And that was sort of the backup plan for these patients, so we've made significant progress since the 1960s for hip replacement.

So in terms of contemporary hip replacements, now we have an uncemented acetabular component that's made of titanium, An uncemented component on the femoral side that's made of titanium, and in between, there are many different bearing options, which I'll touch on in a little bit. But longevity nowadays is 20 plus years, if not longer.

And hip implants that we have changed significantly, where the areas where the bone grows into the implant is more proximal, and that allows more proximal fixation unless what we call stress shielding, so there's less bone loss over time. It really has dramatically improved the patient's quality of life, and there are numerous studies that show that patients do well after hip replacements.

So according to the US Department of Health and Human Services, over half a million knee replacements are done and 380,000 hip replacements done annually. So this is in 2005 data. The hip replacement, this includes both partial and total hip, but I would say the vast majority of those are total hip replacements. And the age group is somewhere between 65 and 84. We're doing it more in younger patients now, because we're seeing more active patients with advanced arthritis that's limiting their activity. There's more women getting hip replacements than men, probably because women live longer.

So here's the projected number of hip and knee replacements the United States. So by 2015, the number of knee replacements is somewhere over a million a year, and hip replacements somewhere around 300,000, 400,000 a year, so quite a bit a number of patients who are getting hip and knee replacements in the US. And you can see the cost of this is tremendous, and the number of revisions. So we're doing it in younger patients, but there's risk for infections, for example, or dislocations, or fractures. We're doing potentially more revisions, and this is the projected number of revisions that will be done in the US.

In terms of arthroplasty options, there's what we call a partial hip replacement, or hemiarthroplasty. And that's really historical. We don't do that anymore for hip arthritis. Now with very longevity that we have with a total hip replacement, that's really the go-to procedure. Hip resurfacing, you probably heard about two years ago, and that was sort of a buzz, and that sort of died away because of the metal on metal issue. Really the gold standard is a total hip replacement.

And this is what hip resurfacing looks like. Interestingly, this has been around for awhile too, because the initial hip resurfacings were done in the '60s and '70s and had lots of failures. And so we kind of went away from it, went towards total hip. With some of the advances in metallurgy, it kind of resurged about five to 10 years ago. And the advantage is that it's a bone conserving procedure. You can always convert this to a total hip replacement, but with some of the metal to metal issues we had recently, I would say this is no longer done in the United States. Very rarely, if any.

This is sort of the gold standard-- total hip replacement. It's an excellent and predictable procedure. It's a relatively quick recovery, so in three months, and less than three months in some patients-- six weeks, four weeks, they're back to normal. And we've really changed the quality of life of these patients. We've made lots of advances in terms of our technique and our pain management that allow these patients to recover quickly and get back to their life.

So in terms of the decision-making, pain is the most important indication. Again, I can't highlight this anymore. It's an elective procedure, so this is a discussion that a primary care doctor and the patient has to have and decide when is the right time for the patient. There is no perfect time or sort of scoring system to say, well, when can I get a hip replacement? It's really dependent on how much the pain affects the quality of life of that patient.

Although it's important to recognize that pre-operative function is probably the most accurate predictor of post-operative function for these patients. And so it's important to, if you feel that these patients can benefit from it, and it's affecting their quality of life, just send the patient to an orthopedic surgeon to be evaluated to be considered for a hip replacement.

In terms of gender differences in hip replacements, it's interesting. Women are less likely to undergo a hip replacement than men. So they're more likely to delay the procedure than men. So as we talked about pre-operative function predicts post-operative function. So in women who push it off longer, their recovery is a little bit slower, because their contractures are worse over time as arthritis gets worse. So that's something to consider as well.

So think about how the pain is affecting your patient's quality of life, and consider a hip replacement in those patients. In terms of their preoperative evaluation, I encourage all patients to go see the dentist. Obviously bacteria, flora, you can get some bacteremia with tooth brushing or dental procedures, which can potentially cede a joint. So if someone has an abscess in the mouth, they would like to have that addressed prior to a hip replacement. I have all my patients see the anesthesiologist ahead of time.

We get some routine labs. If there's a risk for cardiac disease, we have them see the cardiologist. And then one visit with a physical therapist to give them an assisted device to teach about some of the therapy that will happen after surgery and give expectation to these patients. And for our patients who are getting a posterior hip approach, then they will teach them some maneuvers to avoid a dislocation. Although that's pretty rare now with some of the technology we have.

In terms of anesthetic choice, this should be a discussion that's done preoperatively and not the day of surgery. Almost all patients now get what we call a neuroaxial block, so spinal or epidurals. That's made a tremendous difference, I think. The patients wake up. They have no pain. My patients are ambulating the recovery room with the therapist two to three hours after a hip replacement. And that's a really tremendous improvement from 10, 15 years ago where they're in bed for a day, and they get up with a therapist, maybe the next day.

The patient has no pain. So an epidural is really the way to go, because you wake up. You have no pain. You're up and walking. They could titrate that down so that you have motor function but have pain control. Rarely do a patient ever get a general anesthetic, unless there's a contraindication-- if they had spinal fusions or procedures prevent them from getting epidural, then those patients would get a general. But the vast majority, I would say over 95% of my patients get either a spinal combination with an epidural or epidural alone.

So here's a study that looked at blood loss with no axial block. So you get less blood loss with this as well, because there's relative hypotension with a neural axial block, so there's about 400 cc difference in blood loss with the patients who get a general anesthetic versus a spinal epidural. And there's about 20% decrease in transfusion rates for these patients, so it's really a tremendous improvement.

In terms of other complications, neural axial blocks have significantly decreased DVT rates, probably because they're walking these patients earlier, and they're ambulating. That they're less likely to get blood clots, and obviously less likely to get PE. Again, this is another study that highlighted a decrease in blood loss and a decrease in blood transfusion, and the operative time is also less, because you're spending less time trying to control the bleeding. So it's really much improvement.

Here's another one that looked at pain control, and for neural axial blocks versus a general, the pain scores are better. Obvious because they wake up and have no pain. The cost to the care is also less, because you're not giving lots of narcotics in the recovery room and on the floor to control these patients' pain. So really this has made a really tremendous improvement in terms of joint replacement.

In terms of antibiotics, patients get antibiotics for 24 hours. They get DVT prophylaxis, that's Coumadin or are Lovenox. There's a slightly increased risk for a post-operative hematoma with low molecular weight heparin. And some of the important post-operative concerns that we see oftentimes as an internist or someone who manages these patients post-operatively, if there's low grade temperature post-operatively, that's almost always due to atelectasis. It's very unlikely to get a wound infection that presents itself in 24 hours. Almost always that's atelectasis. Sometimes you get a UTI that can contribute to that, which you need to think about.

Tachycardia-- you have no explanation for tachycardia, you've got to think about pulmonary embolism in these patients. Although low likelihood, but that's always in the back of my mind when someone has an unexplained tachycardia. They're not dehydrated, their hemoglobin's normal, their pain is well-controlled but persistent tachycardia in the 120s or one-teens, and I have to think about a [INAUDIBLE] in these patients.

Sometimes patients can have mental status changes afterwards, and we think that might be related to either medication or sometimes a fat emboli in these patients, because they can have sort of this big confusion, and that kind of resolves in a day or two. And that's probably related to a fat emboli. ATN can develop in patients. If they're dehydrated, and the anesthesiologist runs them a little dry during surgery, they can develop ATN.

In terms of physical therapy, we start this as soon as possible, so either in their recovery room, and that's probably a vast 80 to 85 of the patients are up and walking in the recovery room. If they have nausea or vomiting issues, then that gets delayed potentially to the next day, but we try to emulate these patients as soon as possible.

DVT prophylaxis, I highlighted about this. The rate of DVT is somewhere between 1% and 10% in patients with joint replacements, and the PE rate is somewhere between 0.2% and 2%. Fatal PE is pretty rare-- 0.2%. And I treat all these patients with Coumadin or low molecular weight heparin.

This is where you have to consider the cost. For example, in Medicare patients, Medicare will not reimburse low molecular weight heparin if they are going home. That's why I prefer Coumadin, because I think it's simpler. Although it's a more inconvenience for the staff to draw the blood and monitor the INR, but low molecular weight heparin has a higher risk for post-operative hematoma. And the new 10A inhibitors, I really don't like, because you can't reverse those. And so if there's a bleeding issues, then you're stuck. And so I really don't use that. I used Coumadin for most of my patients.

So in my practice, epidurals for everybody, and plus or minus spinal, and Coumadin the morning of surgery, and then for three weeks post-operatively to prevent DVTs.

So here's the expected timeline for our patients. So they see a dentist usually more than three weeks prior to the day of surgery. Two to three weeks prior, they see the anesthesiologist. They have surgery. They're up and walking the same day of surgery or the next day in situations where there's some nausea issue, or it's late in the day, and the therapist is no longer there.

And most of the hip patients go home the next day. And now if patients who have to go to rehab, if they're Medicare patients, they have to stay three nights, and those patients would stay three nights and then go to rehab. But most hip replacements are going home the next day or the following day.



Conceivably they could go home the same day, but I feel like I want to monitor these patients for the first 24 hours to make sure there are no issues, and so that's why I like to keep the patient for at least 24 hours. Three weeks, we stop the Coumadin. They get their first post-operative x-ray at six weeks, and really by six weeks, the younger active patients are fully recovered for the most part. The older patients may take three months to fully recover, but in general, by three months, I tell patients that you should be back to your normal self at that time.

Some of the commonly asked questions that patients ask-- dental prophylaxis. I say yes. It's controversial, and I was involved in a meeting with the American Dental Association a couple years to develop guidelines for patients with joint replacements. And the data really is, there's insufficient data, and so they can't say yes or no whether dental prophylaxis it has a role. I feel that a periprosthetic infection is such a big problem long-term that it's probably worth it to do dental prophylaxis. I do amoxicillin 30 to 60 minutes prior to the dental procedure and Clindamycin if they're penicillin-allergic.

In terms of resuming sports, low impact sports around six weeks-- golf, doubles tennis, cycling, swimming. And then by three months, really most of their athletic activity should be able to return to those activities. Patients asked us a lot, when can they resume sexual relations or sexual activity. About 46% of patients return to their normal sexual activities in one to two months. For men, supine position is most comfortable followed by prone, and for women is supine followed by laying on the side on the nonoperative side. And obviously in knee replacements, kneeling can be painful sometimes early on because of the scar.

In terms of minimally invasive surgery, gains in MIS surgery is relatively short term. So you look at this, the gains are maybe a few weeks, and then by three months, by six months, by one year, both groups are very, very similar. But there are benefits to MIS surgery. Again, the functional scores are better earlier. The difference is really, like I said, in the first few weeks of surgery. In one year, there is no difference, but the patients do like the fact that they have a smaller incision.

So this is a picture here on the left of a patient who had a hip replacement done about 20 years ago, and I had to revise her because of wear. And on the right is a person that had hip replacement done, though I think it was six years ago. Even our incision now is a little bit smaller than that. So there is quite a big difference in terms of the incision size compared to historical procedures.

So some of the hot topics in hip replacements-- hip resurfacing really is a dying dinosaur. I think we're doing fewer and fewer of those because of the issues with metal on metal hips. I won't really go much more on that. The metal on metal hip replacement-- that's another option too, but again metal on metal's been problematic in the last five to ten years.

We've sort of identified that the chromium and cobalt sort of leech in the semic system, and can have other effects, neurologic issues, balance issues, local toxicity in the hip joint. So many companies are no longer making metal on metal hips. In fact, it's not even available with some companies.

Ceramic hip is an option, so ceramic on ceramic is very good wear profiles. Very low wear, but there is a squeak rate, and some literature report up to 10% squeaking, so you want to Google squeaking hips. It's really loud. I mean you can hear someone walking down the hallway. They can't sneak up on you. And Jack Nicklaus has a squeaking hip.

And then more recently, the direct anterior approach. and this is something that is relatively new. There is some potential benefits, and I do this, and I feel that the patients probably recover maybe two to three weeks earlier compared to a posterior lateral approach. The advantage is that there's really no precautions for dislocation. So they could do whatever they want, basically. Whereas with a posterior approach, there are some hip precautions they have to follow, but that's only short term. And by six weeks, by three months, both groups are even.

So the benefits are relatively short term. There is some slightly increased risk for an anterior approach. So 4% of patients can have a lateral [INAUDIBLE] cutaneous nerve injury, because if there's an abnormal takeoff [INAUDIBLE] from a cutaneous nerve, that can be damaged, and they can't get meralgia pain that radiates down the thigh, and numbness and tingling down the thigh. So that's uncomfortable for the patient, something to think about.

And there's a slightly increased risk for fracture through your direct anterior approach compared to a posterior lateral approach. So you really have to weigh the risks and benefits and look at the patient. If someone's overweight or poor bone quality, maybe that's not a good option for a patient for a direct anterior approach.

So in summary, for hip replacements, we have to exhaust non-operative modalities prior to the joint replacement. Injections is a very good option for these patients. Again, this can be done with ultrasound or with fluoroscopic guidance, anti-inflammatories, and weight loss, I think is our mainstay of treatment.

And the time to refer these patients is when the pain affects their quality of life. And you have to keep in mind that pre-operative function predicts post-operative recovery. So in these patients that are sort of delaying and delaying, delaying, delaying, they're sort of slowing down their recovery. And almost all the time, those patients tell me they wish they had done it sooner.

It's an excellent procedure with excellent outcomes. It's probably one of my favorite procedures, because it really alters patients' quality of life. It's a quick recovery. It's much quicker than it was a year ago, probably due to some of our changes in anesthesia with regional and neural axial blocks. Our post-operative pain management has tremendously improved. We have less nausea, vomiting, other complications, and then through less invasive surgery, it's made a big difference in these patients.

So here are some useful websites to go to if your patients have questions about hip or knee replacements. And thank you very much.