

[MUSIC PLAYING]

**CRAIG MAURO:** Hello. I'm Craig Mauro. We're here today to talk about indications for hip arthroscopy. So as you know, hip pain is a very complex problem, which may result in pain in many different areas around the hip. Causes can be musculoskeletal in nature, but oftentimes may be from other inputs such as neurological, GI, GU, or gynecologic problems.

Musculoskeletal hip pain can be presenting either in the anterior, lateral, or posterior part of the hip most commonly, or some medial groin syndromes may be the cause of hip pain as well. So these differentials are quite vast, and certain etiologies tend to localize to different areas of the body. And we must consider this as we work through the cause of the patient's hip pain.

So really, the point of the discussion today is the indications for hip arthroscopy. It's a challenging problem trying to understand where the hip pain is coming from, and we really want to put this all together before we indicate someone for hip arthroscopy. It can be a diagnostic and therapeutic challenge, because as I mentioned before, hip pain may be the result of various hip, pelvic, back, abdominal, urologic, gynecologic, and different groin disorders, all presenting as hip pain.

So our first charge is really to identify a patient who may be a good candidate for arthroscopic hip surgery. So what is helping us to make that decision? Is it the insurance companies? Is it the knee and shoulder experience? We don't have clear-cut guidelines as to, what are the appropriate indications for hip arthroscopy? So it really comes down to clinical decision making.

For me, the first step is really trying to identify, is this pain musculoskeletal pain which is coming from the hip joint? How do we do that? Well, that's really a clinical judgment. This is putting together the patient's history, the physical examination, the radiographic studies, and oftentimes the response to the injections. And oftentimes even other interventions such as physical therapy or other alternative measures to try to identify really, what is the source of the patient's pain?

Oftentimes, patients with hip joint pathology will describe an insidious onset of symptoms. This very oftentimes is in young and middle age adults. Very commonly, there's no prior history of

trauma.

Commonly, patients with hip pathology will describe a groin pain or what we call a C sign as they indicate where their hip pain is located anterolaterally about their hip. They oftentimes have pain with activity, prolonged sitting, getting in and out of a car, and sometimes will have mechanical hip clicking or instability about the hip joint.

On physical exam, oftentimes we'll note reduced range of motion, especially with these provocative maneuvers such as flexion, adduction, and internal rotation. Physical exam is of utmost importance in identifying hip joint pathology. We really focus on the complete physical exam, including gait, palpation, range of motion, strength testing, neurovascular exam, and provocative maneuvers such as the FADIR and FABER position.

Radiographs are an important component for the workup and indication for hip arthroscopy procedures. We always obtain a true pelvic X-ray as well as a lateral radiograph to really first identify, is this osteoarthritis or other inflammatory condition which may be contributing to the patient's hip pain? The Tonnis classification is a tried and true classification for classifying hip arthritis and trying to identify patients that may not be a candidate for hip arthroscopy because their arthritis is too advanced.

Grade 0 and grade 1 Tonnis classification patients really are the better patients for consideration for hip arthroscopy. Once we get to grade 2 and grade 3, this is really a more advanced arthritic picture that likely will not benefit from hip arthroscopy.

Joints space narrowing, again, helps us to identify those patients that may not be candidates for hip arthroscopy. Really, any patient that starts to have some joint space narrowing, we really have to have some caution in indicating them for hip arthroscopy.

Dr. Philippon has written about two millimeters being the cutoff point for consideration of hip arthroscopy. But likely, really any joint space narrowing, I think, should be taken with some caution.

This algorithm came out of Ben Domb's group, which helps to identify which patient has too much arthritis for hip arthroscopy. And in their group, they identified patients with a Tonnis grade 1 or lower or a joint space greater than 2 millimeters may be a candidate for arthroscopic treatment of their hip joint disorder. Patients with more advanced radiographic arthritis, grade 2 and grade 2 Tonnis grade, or less than 2 millimeters of joint space really

should be considered for total hip replacement.

MRI study helps us to identify patients that may be candidates for hip arthroscopy procedure. We're able to identify labral tears. We're able to identify the articular cartilage status. And really, the discussion comes down to whether an arthrogram or non-arthrogram study is more appropriate.

The literature supports that an arthrogram really has a higher sensitivity for identifying labral tears. Chondral lesions are well seen on both non-arthrogram and arthrogram studies. But cartilage sensitivity is really a challenge because of the spherical nature of the femoral head and acetabulum.

Really, for me, the role of the MRI is to rule out other pathologies such as tumor, avascular necrosis, stress fractures. We really want to identify these patients who really aren't candidates for hip arthroscopy surgery. The MRI really is not the definitive test for identifying whether someone is a candidate for arthroscopy, as many patients do have labral tears and other mechanical findings on their MRI that may or may not be causing their symptoms.

So for my practice, I really use the MRI to identify chondral lesions and subchondral patterns of disease, which may predict a poor outcome with hip arthroscopy. As can be seen in this slide, this patient has a preserved joint space on X-ray, but significant subchondral disease and cartilage loss in the anterior joint space, which really precludes them from being a good candidate for hip arthroscopy surgery.

There's always a debate about whether an arthrogram or a non-arthrogram study is more appropriate. We're able to evaluate labral and chondral surfaces very well with a non-arthrogram study. We're able to evaluate for an effusion. The arthrogram really becomes handy when we're looking particularly at the postarthroscopy patient. We're looking at their cartilage and capsule volume. We're looking for any adhesions. We're looking for recurrent tears. And this arthrogram for me really is more helpful in the postarthroscopy state.

We also use the response to the injection to try to identify whether a patient may be a candidate for arthroscopy. I give my patients a log to take with them after they get an ultrasound-guided injection in the office. This helps them to really quantify what type of response they got to the injection, and it helps us to identify really if the pain pattern is truly coming from an intra-articular source.

Sometimes this is given with the MRI arthrogram. However, I've found that this is not really as effective as a decision making diagnostic tool. Oftentimes, patients get some pain from the arthrogram itself, and that may blur the effects of the cortisone. Further, I oftentimes really want to know the pathology I'm treating before I give the patient steroid injections. So I tend to do them as separate interventions.

So after we've tried to identify, is this musculoskeletal pain coming from around the hip joint, step two for me is to really, truly identify, is the pain coming from the hip joint only, which may be a good candidate for arthroscopy of the central hip joint, or is this a compensatory or peritrochanteric problem such as pain coming from the posterior hip joint, from the core, or from lumbar etiology? So in this MRI you see here a partial hamstring tear, which may be a mimicker of posterior hip pain as well.

The other thing to keep in mind is that many patients with primary hip joint disorders may present with compensatory injury patterns. They may present with athletic pubalgia, sports hernia, SI joint pain, low back pain, posterior hip subluxations. And really, the primary problem may be their intrinsic hip disorder such as femoroacetabular impingement. But it's important to recognize these compensatory patterns, as they can cause a secondary pain pattern in and around their core or their hip.

So once we've identified that the hip joint is the source of the pain, we've tried to diagnose any compensatory problems, then we discuss with the patient what treatments have been employed. And we want to find out, is there a role for any continued non-surgical care?

So what is the role for non-surgical care? I would tell you that most symptomatic hip disorders, non-surgical care is advisable as the initial treatment. We spend a lot of time with patients on activity modification. NSAIDs can be helpful. Injections, which we've previously discussed, may be helpful diagnostically, but they can also be helpful therapeutically in the non-surgical treatment armamentarium.

Cortisone or biologics such as platelet-rich plasma may be employed in and around the hip joint. And physical therapy is very important. We work closely with our physical therapists to identify and map out an individualized physical therapy protocol, working on range of motion strength deficits. Very often, patients with hip disorders have weakness around their core or hip abductors, and a very focused individualized physical therapy program can be helpful for non-surgical treatment of these patients.

However, there's very limited efficacy on the long-term effects of these treatments in hip disorders, particularly with femoroacetabular impingement. So very oftentimes, patients will ask, and we have to tell them, we really don't know what the effect of non-surgical care may be on this mechanical hip disorder. But I think it is oftentimes a very important part of our initial care.

So if a patient does fail non-surgical care, the question becomes, what's the appropriate duration of symptoms? And then secondly, is this a condition that I can improve the clinical symptoms surgically with hip arthroscopy?

And secondly, can I alter the natural history of this disease? Going back to the last point, if we intervene surgically with hip arthroscopy, can we alter the long-term course of this hip disorder?

So most broadly, the indications for hip arthroscopy include femoroacetabular impingement surgery, labral tears, acetabular chondral defects, loose bodies, internal and external snapping hip, instability about the hip joint, and then other more specific disorders, such as PVNS or Pigmented Villonodular Synovitis or synovial chondromatosis. ligamentum teres tears, capsulitis, femoral head fractures, and avascular necrosis all have a role with hip arthroscopy.

Other extra-articular indications for hip arthroscopy include peritrochanteric disorders, such as hip bursitis, IT band snapping, and gluteus medius tears. Other evolving indications include posterior hip arthroscopy for such disorders as piriformis syndrome, proximal hamstring tears, ischiofemoral impingement, and even work around the core for treatment of osteitis pubis.

Once we have outlined these first four steps, I think it's important to consider, is this patient otherwise appropriate for hip arthroscopy surgical procedure and all that's involved in the surgery, as well as the postoperative rehab? Specifically, is the patient appropriate age? Are they too young? Are they too old?

What's their medical history? Do they have the capacity to rehab given their medical history? Are they overweight? Are they underweight? How does that play into their ability to withstand the surgery and the postoperative course?

Certainly, this day and age, the narcotic pain medications affect all clinical care we give. Patients that are on narcotic pain medications preoperatively tend to have a less robust improvement in their symptoms postsurgically. And then not just for hip arthroscopy, but likely

across the board with surgical interventions.

Is this a workman's comp procedure, and how that may affect the postoperative course. And more importantly from a technical standpoint, are there degenerative changes? And is there too much arthritis for this procedure to succeed? And we talked about that a bit earlier, but that's an important consideration.

And furthermore, is there hip dysplasia? And that's another discussion and another 30-minute talk. But really want to identify patients with hip dysplasia that may not benefit from hip arthroscopy surgery.

So in summary, this is an important discussion of indications for hip arthroscopy. We want to consider hip arthroscopy in patients who have a history, a physical exam, radiographic features consistent with a clear diagnosis, whether that's femoroacetabular impingement, whether that's a loose body in their hip, or whether it's a peritrochanteric disorder. We need to have a clear diagnosis for why we're indicating the patient for hip arthroscopy.

The patient should have minimal degenerative changes as patients with more advanced degenerative changes really do not benefit from hip arthroscopy procedures. And their symptoms may actually become worse with a surgical intervention from an arthroscopic standpoint.

We want to know that this patient has tried appropriate conservative management. Most hip disorders can be treated with initial period of non-surgical care. And many patients do improve or have complete resolution of symptoms with non-surgical treatment, despite some radiographic findings that they may present with. And finally, probably most importantly, the patient has to have the appropriate expectations and the capacity to withstand the rehab and the surgical intervention to benefit from hip arthroscopy surgery.

Our goals for this procedure are to relieve pain, improve function, and return the patient to activity. And ultimately, hopefully prevent long-term degeneration of the hip joint. At the time of surgery, we hope to address all contributory mechanical factors and put the patient on the road to rehab and successful clinical outcome after their hip arthroscopy surgery.

So femoroacetabular impingement is a catch-all term. It's really a group of symptomatic hip disorders, which are related to underlying structural anatomy of the hip joint, and then superimposed cyclical loads or acute injuries of activities of daily living or athletics.

Femoroacetabular impingement or FAI is a common mechanism, which is the abutment between the proximal femur and the acetabular rim.

It can really be caused by a host of morphological abnormalities to the femoral neck and acetabulum. Most commonly, these are described as cam-type impingement, which is a morphology of the proximal femur, or a pincer-type impingement, which is an overhang of the acetabular socket.

These examples show what the structural makeup of the proximal femur and acetabulum look like on schematic, MRI, and X-ray. This is a normal appearing head and neck junction where there is offset between the femoral head and neck and there an appropriately covered acetabular socket.

Cam impingement can be seen radiographically when there is a loss of offset at the femoral head-neck junction, and in these cases, some sclerosis or cystic changes at the femoral head-neck junction as compared to the more normal appearing contour as seen on the posterior aspect of this hip.

A pincer-type impingement can be seen where the overhang of the acetabulum creates a very deep socket and [INAUDIBLE]. A mixed-type impingement picture will present on radiographs with a loss of offset at the femoral head-neck junction, as well as a whole host of acetabular-type changes, such as a deep socket or ossicles or a low-hanging AIS, which can all contribute to an acetabular-sided impingement.

So with femoroacetabular impingement, we think of this as a repetitive collision between the femoral head-neck junction and the acetabular rim, which leads to labral injury, ultimately chondral delamination, and over the course of oftentimes many years, a degenerative cascade. Most commonly, this is localized to the anterior superior region of the acetabular rim.

Very often, the severity depends on the duration of symptoms. Oftentimes, we will see more advanced radiographic and clinical features in patients as they become older and have more longstanding repetitive impingement.

We must keep in mind, however, that this is a syndrome. It is not purely a radiographic finding. In order for patients to truly have femoroacetabular impingement, they must have these radiographic features, but also clinical symptoms such as deep groin pain and physical examination signs, such as reproduction of their symptoms in FADIR position.

The etiology of femoroacetabular impingement is controversial, and really frankly, poorly understood. We don't really understand whether this is an adaptation to running and climbing. Is it the result of humans with large-brained fetuses? Is this a response to a micro slipped capital femoral epiphysis during childhood? We see genetic factors and geographic variations certainly contributing to this pattern of femoroacetabular impingement.

Most oftentimes, the clinical presentation is the insidious onset of symptoms in active, young, and middle aged adults. Most commonly, there's no history of trauma. Patients will present with groin pain or more oftentimes what we describe as a C sign where the patient places their hand on the anterior and lateral hip, indicating where the pain is.

This pain may be associated with activity, prolonged sitting, or getting in and out of a car. Patients may have painful clicking, locking, or instability about the hip joint. On physical examination, oftentimes we'll see a reduced range of motion, particularly with internal rotation, and a loss of deep flexion, adduction, and internal rotation, which oftentimes reproduces their symptoms.

So we previously discussed the indications for hip arthroscopy, but we really want to consider this in patients who have a clear diagnosis based on their history, physical examination, and radiographic findings. They must have minimal degenerative changes.

They should have gone through a course of non-surgical care, as this is indicated in most patients with femoroacetabular impingement. And the patient has to have the appropriate expectations and the capacity to rehab. Our goals with hip arthroscopy for femoroacetabular impingement are to relieve pain, improve function, return the patient to their activity levels, and ultimately to prevent joint degeneration.

Technically, we want to address all mechanical factors which may be contributing to the impingement disorder. So classically, these were done in an open fashion, but now we have the capacity and the techniques and surgical experience to perform most femoroacetabular impingement surgeries in an arthroscopic fashion and achieve similar corrections.

There are still some indications for open treatments such as periacetabular osteotomy, certain labral reconstruction techniques, and surgical dislocation for more circumferential impingement morphologies. Arthroscopic treatment really has allowed us to access the hip joint in a safe way to affect treatment on the bone, labral, and chondral pathologies associated

with femoroacetabular impingement.

So the setup for femoroacetabular impingement hip arthroscopy surgery is of utmost importance. This may be done in the supine or lateral position. Most of the complications associated with hip arthroscopy are related to patient positioning. So extra caution and attention must be given to patient positioning during hip arthroscopy procedures. We use an extra large perineal cushion to optimize distraction and minimize compression-related neuropraxias.

The first step to a successful hip arthroscopy surgery is the access to the hip joint. Patients must be placed in a safe position. They must be well padded, and all the areas of the hip joint which may see compression are appropriately padded. The patient is prepped and draped to allow access and visualization of both limbs.

And traction's placed across the hip joint to allow access into the central compartment of the hip joint. This is done with straight traction, and then an adduction moment over the large perineal post.

Traction allows access, as we've seen. In this instance, there's a large degree of traction. And a subluxation pop is almost always heard when a successful traction is achieved.

The steps are very systematic with hip arthroscopy. We want to access the joint. We want to consider whether we do a capsulotomy. We do our rim work if indicated. We do any labral refixation or reconstruction as indicated. The hip's then taken out of traction. We perform our cam decompression as needed. And then we do our capsular repair or plication as indicated.

So this is an illustrative case for identifying the steps of a hip arthroscopy for femoroacetabular impingement. It's a 28-year-old recreational soccer player. Previously had performed hip arthroscopy surgery on his right hip. He had a successful outcome.

And he had these findings for his left hip. As shown on this X-ray and MRI, he had a large cam deformity of his proximal femur, he had a large anterior superior labral tear, and relatively healthy appearing cartilage as seen on the MRI.

The initial inspection of the hip joint is performed from the anterolateral portal. In this case, a probe is introduced through the mid anterior portal, and the chondral labral injury is identified.

The next step is preparation of the rim. So in this scenario, I chose to use a knotless fixation,

which required visualization of the rim adjacent to the labral tear. So in this case, preparation of the bed was performed. The bony preparation includes a burr and allows for bleeding [INAUDIBLE] bone for the labral repair. It also allows for any rim, pincer-type work that may be needed for a mixed-type femoroacetabular impingement.

So in this case, once the rim preparation is performed, I evaluate the labrum. In this case, the labral tear is visualized. The chondral delamination is seen. And it is noted that this labrum is still robust, even though it is unstable at the chondrolabral junction. And it is a candidate for labral repair.

So we begin our label repairs at the 12 o'clock position. This is a left hip. We're beginning at the 12 o'clock position. The indirect head of the rectus can be visualized next to our starting point. I pass a wire, in this case. There are various suture passing devices or wires, which may be used to pass a suture through the chondrolabral junction.

Prior to doing any debridement cartilage or labrum, I like to pass my stitches first. So we, in this case, used a mattress stitch. The suture was initially passed through the chondrolabral junction, and then a second pass was made through the labrum, which allowed this taped suture to be passed in a vertical mattress fashion through the labrum and back out the anterolateral portal.

In this case, we did a knotless fixation of the labrum. So once the suture has been passed, a drill guide and drill is used to perform a drill hole adjacent to the labrum stitch. And this is visualized from the mid anterior portal in this case.

The drilling is performed from the distal anterolateral portal to prevent any penetration into the cartilage surface. In this case, a knotless suture anchor is utilized to refix the labrum in a vertical mattress configuration. As can be seen here, the knotless anchor is placed. And you can see the tension that is achieved through the labrum by the placement of the anchor.

Care must be taken not to overreduce the labrum. We want to achieve a successful labral seal. So in this case, I'm using a suture tong to hold the suture so I do not overconstrain the anchor and suture construct when it is impacted into position. Once we're satisfied with our tension, the anchor is deployed to complete the fixation with the first anchor.

This fluoroscopy image just shows the first anchor at the 12 o'clock position. The sutures are then cut and the knotless fixation is completed. We then in this case proceed to perform two to

three more anchors more immediately. I then fully evaluate the cartilage lesion, which is the result of the impingement. In this case, a chondroplasty was gently performed. A microfracture is sometimes indicated if there is evidence of a full thickness cartilage defect.

What we're trying to achieve with this labral repair is a suction seal. So in this picture, we can see once the hip is taken out of traction that there is excellent restoration of the suction seal between the femoral head-neck junction and the acetabular rim.

The hip is then taken through a range of motion to ensure that there is no residual impingement. In this case, the burr is used to perform the femoroplasty. And after the femoroplasty is performed a dynamic exam is performed, showing that the labral suction seal has been restored and there is no residual impingement between the acetabular rim and the proximal femur once the femoroplasty has been performed.

In almost all cases, we perform a thorough capsular repair to ensure that the patient does not develop any postoperative instability of hip joint and to allow more restoration of normal mechanics about the hip joint.

Outcomes show very favorable outcomes with hip arthroscopy surgery for femoroacetabular impingement. Chris Larson and his group reported mean 3.5-year outcomes, which showed better outcomes with labral refixation than a simple debridement alone. Ben Domb and his group showed excellent PRO scores at two years with predictive preoperative factors including preoperative hip outcome scores, non-arthritic hip scores, as well as age and duration of symptoms contributing to the patients' outcomes.

So in summary, hip arthroscopy surgery for femoroacetabular impingement is a very successful intervention in appropriately indicated patients who have defined pathology and oftentimes have failed non-surgical care if appropriate attention is given to the technical aspects of the procedure we discussed here today. Thanks very much.