Academy of PHYSICAL MEDICINE

Transcript

Hip Surgery
With Johan Witt

APM: We're in London, again, a consultant surgeon, Mr. Johan Witt, joins this evening and me. He's been a doctor for over 35 years now, specializes in hips and has a wide range of hip interests and has written over 30 papers in the peer-reviewed journals within the medical fraternity. Johan, welcome to the Academy of Physical Medicine.

JW: Good evening.

APM: It's a great pleasure to have you with us.

JW: Good evening, Steven.

APM: I thought I'd start by asking you about the scope of your practice and just how much do you cover as a hip surgeon?

JW: So over time, what we've become more and more interested is a lot of ways that we can try and preserve hips from stopping them becoming damaged. So whereas when I started out doing hip surgery, it would've been primarily related to hip replacement. So because hip replacement is such a…or has been such an effective operation, I think in some respects, other options were sort of slightly sidelined and I think over the last 15 years or so, I think we've increasingly understood the kind of abnormal shapes that hips have and which abnormal shapes can lead to early damage, the sorts of symptoms that younger patients can have that can be an indication that they're going to be in trouble later on in life and it's —

APM: So do you do a lot with pediatrics as well then?

JW: It's mainly…I do it from an adolescent aged group and then into, yeah, late adulthood. So a lot of it relates to joint preservation stuff, recognizing abnormal shapes to hips as well as joint replacement.

APM: And when you say joint preservation, hip preservation, what does that actually mean? Is this anticipating damage that might occur and giving people conservative measures, treatment to prevent that or —

JW: So there are two things. One is I think recognizing when someone is getting early symptoms from a hip that may have an abnormal shape and being able to understand that we want to both make the hips more comfortable because a lot of the times, patients will come to us because they can't do their sport anymore or they're already just having pain with sort of daily activities. So I think a lot of the time, we want to really understand why they're having those symptoms. So our intervention is really geared at, first of all, improving their symptoms after they've often been in…run through a whole gamut of conservative approaches. So the surgical intervention, really, is aimed to reducing pain and then the secondary gain is that we think there's quite a lot of evidence that suggest that we can actually extend the life of a hip, to try and stop it from being damaged and therefore, put off the day that they might need a hip replacement.

APM: Our audience, of course, is primarily physical therapists, so as osteopaths, chiropractors, physios, sports therapists and so on. There's clearly a real interest there. You're into hip preservation and that means that we're likely to see some of those signs that you would be looking for in the abnormal hip. What should we be looking for in our treatment rooms when someone comes in complaining of groin pain, hip pain, knee pain?

JW: So I mean it's true that a lot of our patients will usually present first to physiotherapists, chiropractors and osteopaths and actually, we rely on those individuals to flag up when there are issues and I would say the common thing, really, is this sort of idea of someone having a recurrent groin strain. So recurrent groin strain usually indicates that there's a problem with the hip and what we often find is that patients will give a history of…they've been able to play their sport and they start to get a sore groin. They have to take some days off then they may actually take many months off to get better but then every time they go back, their symptoms return and I think that's an important point to pick up and that's when it's very important that a clear diagnosis is made.

APM: How are we going to do that? When somebody comes into the clinic, a rugby player, a football player and they're complaining of a recurrent groin strain, actually, it could be just somebody who's going back to sport too early, who's overdoing it before the tissues have healed, what's the diagnostic criteria you'd be looking for?

JW: Well, I think the history is often pretty typical in terms of the recurrent nature, where the patient's complaining of pain. So there's a number of features there that actually are very characteristic and then there's some critical aspects about the examination that tends to make it fairly clear and then following on from that, of course, is there's…which I think is a very important discussion is what might the first investigation be and then when would onward referral be appropriate.

APM: Of course, we see quite a few patients who will come to us with copies of their MRI, possibly the images themselves but often the reports. I mean is it possible that we will see somebody with an MRI, which we ought to think, is slightly suspicious or an x-ray, which might be suspicious before it's been picked up by the GP or consultant somewhere?

JW: I think the investigation side of things is difficult. I often find that nowadays, patients are getting referred to us having only had an MRI, for instance. Now, an MRI scan isn't very good at picking up the overall abnormal shape of the hip joint. Not only that, a lot of the MRIs, particularly of the hip and pelvis, are not focused. So often, the right protocol isn't done for actually what's being reported on. So some of the reports are not necessarily able to really, you know…with any degree of specificity, indicate what's wrong with the joint and also, one has to be a little bit wary about some of the x-rays that are reported may not be reported by a musculoskeletal radiologist and often, reports are just reporting on whether there's arthritis or not and not reporting on whether the hip is an abnormal shape or not. So you may have a patient who's been told they have a normal x-ray and of course, the GP will only ever get the report. They'll never see the x-ray. And so an x-ray that's been taken with a…which has been called normal may in fact not be normal. So that is an issue that we find on a regular basis.

APM: Are the abnormalities you're talking about… perhaps you'll talk about what you mean by abnormal shaped hips in a second but are they the sort of thing that a physical therapist of any description would be able to recognize without going through radiologist training if they saw the images or would they have to say, "Well, you know, can we get a musculoskeletal opinion on this to define —"

JW: I think it depends how often one's looking at x-rays. So it's very much a matter of, you know, the frequency that people are looking at x-rays and then actually, it's very much pattern recognition and if you're looking at things frequently enough and you know which particular things to look for then actually, I think it's not that difficult because there are just a few key things that one needs to look at clearly.

APM: And would you…I can't say what's typical for x-rays of the hip. I mean would you want to see a weight-bearing x-ray to get real information on this or —

JW: I think there's different information that one gets with weight-bearing films and supine films but actually, I always start with a supine film, supine AP pelvis. That gives most of the information initially that one needs. Yeah.

APM: So what are the abnormalities that you were talking about that might present in an adolescent?

JW: So I think the things that we look for, particularly this whole concept of femoroacetabular impingement…this is an area that there's been a lot of interest in recently. We know that people presenting with labral pathology, labral tears and that's often how they come to us with an MRI scan flagging up a labral tear even though, you know, the MRI might not be very, you know, sensitive in picking that up. In fact, you know, most of the time, one needs a sort of MR arthrogram if you're going to pick up those things but having said that, we often get patients having an MRI scan that's reported of showing a labral tear. I think the important thing about a labral tear is that a labral tear in isolation is rather rare and normally, there's some abnormality of the hip that's led to that labral tear. So it's very important that we then address the abnormality that led to labral tear because if you don't then you'll end up with the same problem arising again.

APM: What would that abnormality be? Is there a typical abnormality that —

JW: So a typical abnormality will be something what we call a cam-type shape to the femoral head. That means that the femoral head isn't round. Now if you have an unround femoral head, articulating with a hemispherical acetabulum then over a period of time, you get mechanical damage to the rim of the hip. Now the other thing is if the acetabulum is rather over developed in one area and maybe under developed in another, you can get damage to the labrum from direct impingement on the rim. So there are a couple of areas, a couple of types of femoroacetabular impingement that we refer to, namely the cam-type and the pincer-type and then there may be a combination of the two.

APM: You co-authored a paper, I believe, on the reliability of diagnosis and treatment of femoroacetabular impingements, didn't you? And I think it was a few years, 10 years ago? It was awhile ago but I think the findings of that were that the inter-operator reliability was kind of —

JW: There are a number of things that we've looked up over time, in particular, looking at the acetabulum morphology and whether you can, just on plain radiographs…we use CT scans a lot too, to really clarify the morphology and we've found, you know, radiographs can be a bit…not sensitive enough really to pick up some of the subtle abnormalities. Although the clues are there on the x-rays, one often needs more intricate imaging to actually give some objective information.

APM: If the inter-operator reliability is only fair, as I think was the finding of the paper that you wrote, does that mean that someone really has to come to a person who specializes solely in hips if they're going to get a reliable answer to the likely cause of —

JW: I think young adult hip surgery is definitely a specialty in its own right. So, you know, if you turn up to a joint replacement clinic and you're a young patient who's got a painful hip, often, the diagnosis won't be made. So, you know, it is a specialty in its own right. It's important that patients are seen by people who are seeing enough of these things. Otherwise, they just don't recognize.

APM: So in terms of other conditions other than impingement, what do you see a lot of?

JW: So the other area that we see a lot of, primarily in females, is hip dysplasia. That's where the acetabulum is too shallow and if your acetabulum is too shallow then you tend to overload an area of it and that's another reason. Overloading a rim of the acetabulum, for instance, is an area where you'll then produce a labral tear. So that group tends to be a female group. They present in a very similar way. So all these patients tend to present with activity-related groin pain but the findings with the history and the findings on examination will be rather different between these groups.

APM: Typical age for that?

JW: It'll be anytime from sort of 20's to, you know; mid 40's would be the sort of age groups that we're dealing with.

APM: And do you deal with soft tissue injuries as well, bursitis or sciatic-related —

JW: Yes. So, you know, when one's examining a patient and taking the history and evaluating where the symptoms are coming from, it's really important that one works out whether it's a hip joint problem or whether it's a soft tissue problem because there's a big crossover and often, you can get soft tissue problems but then they are secondary to the primary hip problem and working out what's what is very important. So when there are a few areas which are painful or where the radiation of pain is a bit atypical, we spend…we do quite a lot of intra-articular joint injections, for instance, or we inject local soft tissues to try and evaluate where the symptoms are from. So not infrequently, we have to rule out bursitis pain, iliopsoas pain, rectus femoris and then, of course, there's the whole groin hernia kind of area that's also important to evaluate.

APM: I've had mixed opinions from other experts about trochanteric bursitis. I mean one that it's often over diagnosed and that then the causes are not the bursa at all. Is that what you found or…I'm sure diagnosis is more accurate.

JW: So I think we tend to refer to it as a peritrochanteric pain syndrome rather than trochanteric bursitis, which isn't a very meaningful description. So I mean periotrochanteric pain syndrome really takes into account a lot of things. They can be irritation of the bursa but frequently, there'll be a tendinopathy of the abductor attachments. There can be issues related to ischiofemoral impingement. That's an area where we're looking at more and more where you can get some sciatic nerve impingement as well. So there's a lot of things that can create lateral hip pain but again, one needs to assess —

APM: What would give rise to that ischial impingement?

JW: So it often can be related to the actual morphology of the hip. So we often see patients who have a rather valgus femoral neck-shaft angle, who have a very anteverted hip then actually, there's very little space between the lesser trochanter and the ischium and because that space is very narrow, they can actually get impingement between the two and because the sciatic nerve sits in that trough there, you can get some sciatic nerve irritation as well. So that can be quite misleading sometimes.

APM: And what would your approach to that be?

JW: Again, it's being clear about the diagnosis and then often, one does some selective injections and depending exactly what the underlying abnormality is, sometimes one has to deal with the femoral morphology. Sometimes it's necessary to do a sciatic nerve decompression. Sometimes they have a bulky hamstring attachment which further decreases that space and therapy really specifically, you know, targeted towards the hamstring origin may relieve symptoms.

APM: Now, when you say a sciatic nerve decompression, what does that physically entail?

JW: So it means following the sciatic nerve up, from the ischiofemoral region up to the piriformis and seeing that it isn't being tethered. We've found increasingly that there can be some local adhesions and things that tether the nerve.

APM: Is that particularly the case with those people whose sciatic nerve goes through the piriformis or…?

JW: That can be a further group that is more prone to this kind of abnormality. You know, I think it's very much an evolving area, this whole area of posterior hip impingement. It's definitely not something that's easy to diagnose and I think we're still trying to evaluate the sort of treatment algorithms for these conditions.

APM: And I suspect that a lot of our viewers this evening will be interested in how that feeds down to them ultimately because, of course, they may well be, as you said earlier on, the first point of contact for someone suffering that sort of pain and typically, an approach might be trying to relieve the tightness of the gluteals or the piriformis, to try and relieve pressure on the sciatic nerve. Now, is that going to have an effect in the cases that you described?

JW: So I think that always would be the first, you know, approach to these particular conditions. I think first, recognizing is it a hip problem, is it a back problem and then focusing on the soft tissues to try and address, you know, the symptoms. So often, it's sort of deep gluteal pain that these particular patients are experiencing, particularly that comes on with walking. They have a shortened stride length. There are a few particular issues associated with that particular syndrome. It's much less common than what I generally deal with on a day-to-day basis, the whole sort of anterior hip impingement type problem but it's another area that we're seeing. I think recalcitrant, you know, treatment of some deep gluteal pain we're sort of discovering is related to these sorts of sciatic nerve issues.

APM: Those people you spoke of earlier on with hip dysplasia, if there is an area of increased force between the ball and the socket, does that mean that we're going to see erosion of the cartilage there and therefore, increase osteoarthritis of the joints as well?

JW: So there's very good data on the long-term outcome of patients who have dysplastic hips, symptomatic dysplasia, that is. So, you know, there's also information that patients who have symptomless dysplastic hip don't necessarily go on and get a problem. However, patients who have become symptomatic and they have a dysplastic hip, that is something that is important to pick up because we know that over a period of years, that the acetabulum can be very badly damaged and before there's too much articular cartilage damage, there are very good surgical options to address the overloading with, you know, very good long-term outcomes in terms of both symptomatic relief and joint preservation.

APM: What about the reliability of orthopedic testing for the hip in the absence…I mean in our clinics, we're unlikely to have CT or MRA or MRI readily available. What are the best orthopedic tests that we can rely on for —?

JW: Well, the first thing I would say is to ask the patient where their pain is. So there's something called a C sign. So if you have pain coming from your hip, patients will cup their fingers like that and then they will put it around their hip joint because they can't quite localize where the pain is coming from. So, you know, always ask the patient, "Where do you feel your pain?" If they can put a finger directly on it, particularly if they point to the lateral side of the hip then it's most commonly coming from the bursa area but a hip joint pain is very difficult for people to localize and they kind of use all sorts of ways of

triangulating to the center of the hip joint as to where the pain is coming from. So it's really worth asking, you know, "Where do you feel your pain?", getting the patient to do that because that would already indicate, you know, the likely source and there are few sort of tests that we would do to further evaluate and the most sensitive test but it's not specific…the most sensitive is what we call the impingement test and that's a test where you rotate the hips so that the femoral neck abuts against the rim of the acetabulum and all these hip conditions cause their initial injury with the labrum. So it's the labrum that always gives way first. The labrum is very heavily innovated. So that's where the pain tends to come from. So when you move your hip and you cram it up against the labrum and the labrum is injured, that's why it's painful. So it's a very sensitive test but it's not specific for one particular condition. So then the rest of your evaluation then has to be to work out which particular condition has caused the injury to the labrum and hence, the painful hip.

APM: And that means imaging, is it?

JW: It means further part of your physical examination and then it'll be the imaging, yes. So there's some other clues on physical examination that I think one looks at.

APM: I suspect that a lot of our audience, rather like me, are interested to know what an orthopedic consultant's hip assessment is like, what it includes. Can we run through that here and have you demonstrate how you would assess a patient? I suspect yours is going to be very quick and efficient given your experience there. So right, so if I let you go over to that treatment table, I'm going to be your model for this evening. Just a reminder to those of you watching, please keep your questions coming in because, you know, this is your opportunity to get a real expert opinion on all matters related to the hip and across, I'm sure, the whole age range even though Johan's experience is largely with adolescents and above. And while I'm on the subject of hips, don't forget also to look at the last broadcast with Laurie Hartman when we dealt with hip impingement there as well. You'll find that's really useful. I had one of our members contact me today to say that he used it only yesterday in clinic for the first time with astonishing results. So it's well worth a look. It's a very easy technique to use in clinic. Right, I shall move across now and become Johan's patient and we'll see how an expert does this. Now, I think you wanted me supine —

JW: Steven, if you wouldn't mind lying down on the couch. So just with regards to the C sign, if you haven't sort of seen people just trying to describe their hip pain, they'll be doing this kind of thing, saying that, "My pain's somewhere there," or they'll be sort of saying, "Well, it's somewhere in there. Sometimes it's like a needle or something trying to hurt me there." And so most hip pain is felt in the sort of groin, thigh. Those would be the most common areas that the hip pain is felt. Radiation to the gluteal region is not infrequent as well.

So I always start by just seeing what the soft tissue laxity is like. We know that, you know, patients who have hypermobility very commonly have musculoskeletal problems as I'm sure you're aware of. So part of our workout will be to do a Beighton score on patients, particularly to the female group because they were…and we have to be very careful, the way we manage them if we're going to operate on them as well. So it's very important to have a feel for soft tissue laxity and you can get an assessment, particularly, with sort of the so called log roll test in the hip to see how much the foot…how much recoil there is. So patients who have a lot of laxity of their ligaments in the hip, the foot will tend to just sort of flop out and then just sort of stay out like that. It won't have any elastic recoil and most of the patients I'm examining are sort of young. They have a good range of motion in their hips. So what we're trying to find out is where the hip hurts. At which point of their range of motion their hip hurts. So mostly, we'll just start with the patient lying flat, I'll take all the weight of the leg. Always feel the pelvis; obviously, to see if there's any movement and we just make an initial assessment of hip abduction and again, that will be very unusual to be restricted. Once you start to get restriction and movement, a lot of restriction and movement then you're thinking much more in terms of a degenerative hip, a hip that's already developing osteoarthritic changes. So usually, we're dealing with patients who have a good range of motion. So once you've established that they've got good abduction, what I like to do then is to flex the hip and we bring it up to 90^{o}, we flex the knee to 90^{o}, we flex the hip to 90^{o} and then we look to see how much internal rotation they have in flexion. So if we're starting there, that would be zero. And so Steven, you have about 25^{o} of internal rotation of your hip in flexion. And then what we want to do then, we do a…the impingement test is actually quite a vigorous test. I won't overdue it in you in case something bad's going on and we provoke something but basically, you do often have to crank the hips significantly. So we're sort of doing that movement like that and what we're trying to do, we're trying to hit the neck on the rim of the acetabulum. It's no good if you do it gently because you won't actually provoke pain. Now, in women who have a dysplastic hip, the impingement point is a lot further than, say, in a male who has an impingement type problem such as cam impingement. So women with a very anteverted femoral neck, with a dysplastic acetabulum, we're often reaching the impingement point somewhere way over here. The hip can internally rotate the very long way, it can adduct and it can flex and it'll be there that you reach your impingement point and it'll be there that you get your groin pain whereas in a big sort, you know…a rugby player with a rather, you know, stiff, big cam impingement, he'll probably reach his impingement point in about that position.

APM: And what's the end feel like for you on that? Are you getting a solid end feel when you —

JW: So in a patient who has femoroacetabular impingement, you'll get a solid end feel. In a patient who has hip dysplasia, you won't get that same end feel.

You'll just get the pain but you won't get that kind of block. Now what's very important with this particular test is…I always like to also assess rotation of the hip but with the patient lying prone. Would you be able to do that?

APM: I can. I might have to be careful about my mic. How do you want me? Centre of the table.

JW: So prone's important because examining what hip rotation is in extension and how it changes with flexion is what we're interested in. The only way you can measure it, really, is with someone who's lying on their front and for internal rotation, we're letting the foot go out and then we can see that Steven has about 20°, 25° of internal rotation and then we come this way and he has rather more external rotation, so probably about 50° of external rotation. That's great. Come on back up now, Steven. So the significant —

APM: Supine?

JW: Yeah. But, you know, in a patient, for instance, a young female who's got…your examinee who might have dysplasia; they often have a lot of internal rotation. They've got an ateverted femoral neck. We'll be able to internally rotate them maybe 50°, 60°, 70° but they may only have about 20° of external rotation. If we're looking at a patient, a young patient who's got femoroacetabular impingement with an aspherical femoral head, they'll often have, say, 20° to 30° of internal rotation but as we bring their hip up into flexion, suddenly they absolutely lose their internal rotation. You'll find a lot of these patients literally will have virtually, you know, 5° or 10° and you'll feel a real resistance at that point. So I really like to look at the difference between the rotation in extension and rotation of the hip in flexion. It tells you a lot about what's going on in the joint and where the impingement is and a lot about the morphology of the hip joint. Other things that are helpful, I always like to see what the sort of FABER test is like. What we do, we do that with…I tend to rest the leg on the shin and basically, we assess how far the knee comes down towards the couch and if that produces pain in the groin area, often, again, that can be related to labral injury and we think that's because the femoral head is being levered up against the labrum and that's why it can be sore. It's a helpful test because during the patient's recovery, you know…if you compare it with both sides and you make an assessment in your examination to see how far the knee reaches the couch on each side then during the patient's recovery, you can see that improve as they're getting better. So often, someone with a labral tear, for instance…now, they get a lot of spasm and they won't be able to get more than about that with a FABER test and that will gradually come out. There's another test that we do that we call the apprehension test. It's a bit like the shoulder apprehension sign in the shoulder. We bring the arm up like that and by twisting, abducting and externally rotating it, you're kind of tending to subluxate the humeral head. Well, we can do the same with the hip and we do that with the hip coming out into extension and then we rapidly externally

rotate and in someone who's got a shallow acetabulum, they'll be levering the femoral head. The femoral head will be wanting to come out the front of the acetabulum and that produces this sense of apprehension in the patient. So that'll be…yeah. So yeah, the apprehension test, what we do is we're going to bring the leg out into abduction and then extension. You generally want to have the patient towards the edge of the couch and then we rapidly externally rotate it and that's levering the femoral head a little bit out the front of the acetabulum.

APM: Are there any risks with that, with somebody who has got a shallow acetabulum?

JW: No. So you can't dislocate a hip. I mean, you know, you can in some very hyperlax cases, patients, you know…we have seen hips subluxate slightly but in general terms, unless you've got, you know, Ehlers-Danlos type hypermobility, that's never going to happen. So no, there's no real anxiety about that. So those are the things I focus on. Then obviously, we see patients walk. There are some other features that we look at but I would say that's my sort of screening examination for most cases that I'm looking at.

APM: I feel like I'm being sized up for a hip replacement at the moment. How am I doing so far?

JW: Well, Steven, you are more in that age range.

APM: Thanks very much. What have we got here? I've got…a question's come in. What's the male-female ratio for congenital hip dysplasia?

JW: So the dysplasia, probably about 80% to 85% women and then about 10% to 15% tend to be males. What's interesting is that the prevalence…so, you know, if you take a population and…because there had been a couple of studies that have looked at symptomless patients with…who've undergone x-rays of their hips. The prevalence of dysplasia is actually not dissimilar in males and females but it's always the females that we see ultimately presenting which is interesting. So yeah, so mainly, I'd say patients come to us…dysplasia is very much a female thing. Cam impingement is much more a male thing. So that already helps you decide, you know, who's likely to have what when you're seeing them in the clinic.

APM: And the difference again on your assessment test there is the cam impingement with the harder end feel.

JW: Will be the stiffer hip, yeah.

APM: Shall we go back to our seats then? If anyone has any more questions about assessment, we can always come back and do some more in a moment. I've been asked to remind or inform our viewers that we did, of course, in this

very studio, have a very, very interesting broadcast on juvenile hypermobility and hypermobility generally. I recommend that to everybody. If you're interested in Beighton scores and so on then that was discussed and there are some downloads to go with that one. So have a look at the hypermobility broadcast at some point. I have got another question here. I need to read this because it's quite lengthy. Hip precautions are often given to patients to follow strictly but there seems to be little evidence to support these. Is it something that's positive to help stop dislocations or are some people just more prone to risk of dislocation? And that was sent in by Dennis. So thank you, Dennis.

JW: So this is hip precautions after hip replacement, I'm assuming.

APM: Let's go with that and if Dennis disagrees then Dennis can send us an update on his question.

JW: So yeah, we're doing away more and more with hip precautions, you know. When patients come in the hospital, there days when we're sort of assessing their…how high their beds are, how high all their chairs are. So we're doing away a lot with —

APM: So what is he…what? What do you mean by hip precautions —

JW: So the thing is when you're…every hip has a specific range of motion. When you've had a hip replacement, it's not only an operation, which is a bony operation, but it's also a soft tissue operation. One has to repair the capsule and the soft tissues around the hip to make sure the hip remains stable. So during that…particularly the first six weeks while the soft tissues are healing, the hip can be a bit vulnerable if particularly it's…so it depends a bit on the approach of the hip replacement but for instance, many hips are done through a posterior approach. That means the soft tissues at the back of the hip have been interfered with and will need some time to heal. So for that reason, if you do a lot of flexion combined with internal rotation, there's a risk that you could lever the hip out the back before the normal soft tissues have got strong and act as a check reign to those movements. So that's the issue with the hip precautions. Now, with some approaches, for instance the anterior approach which is the one I tend to favor, you know, there's even less of a worry because we don't interfere with those posterior soft tissues but I would say we're a bit more relaxed about them than —

APM: This is for hip replacement.

JW: That's for hip replacement.

APM: I noticed on your website, you talked a lot about the fact that, you know, you use the anterior approach, it does less damage. You don't actually divide muscles, apparently, in an anterior —

JW: That's right. One separates muscles as opposed to dividing muscles. That's correct, yeah.

APM: And I'm always puzzled by this and I know that, you know, as a medical consultant, an orthopedic consultant in particular, you've got an awful lot of discretion in how you go about various types of surgery. Why would anyone prefer the posterior approach to the anterior approach?

JW: I mean, you know, there are pros and cons to each approach. It depends a lot on the deformity of the hip joint. Sometimes one approach can give you a bigger access to different parts of the femur, different parts of the acetabulum. Some of the reconstructions, we need more space to do what we need to do whereas if it's a bit more straightforward anatomy then we need less space and we can get away with less access to the joint. So often, it's related to the access you need to the job that you need to do. So obviously, one doesn't want to compromise doing a good hip replacement and there are some ways that sometimes that we can do it through a minimally invasive approach. Other times, one needs a bit more access —

APM: So there are occasions when you would take a posterior approach —

JW: That's correct, yeah.

APM: Some more questions. This is from Annabelle. Could you possibly explain …would you ever replace a hip joint with moderate to severe OA on x-ray who has chronic gluteal pain but is asymptomatic for pain in the groin?

JW: So again, I think atypical pain, if you've got symptoms that seem to be coming from the hip, you've got a stiff hip then we do an intra-articular injection. If that pain got better, the patient said, "Wow, that was great for two weeks. I felt just so much better," then you know that you're going to help them with your hip replacement. Obviously, it's not a good thing if you replace someone's hip and find that they've been complaining, you know…it's been a disc prolapse all along or something else has been going on. So that's why the intra-articular injection can be extremely helpful to tease out these particular things but yes, if one, you know, showed that it was from the hip joint then absolutely. That can all get better with the hip replacement.

APM: I've got a question from Claire in Manchester who wants a little bit more information on how you would deal with hypermobile patients when you're considering surgery. Does it affect your approach?

JW: Yes. So I think it's very important that they're seeing a physiotherapist or a therapist who is experienced with hypermobile patients. They do need a slightly different approach, I think. Often, if you overdo exercise activity with hypermobile patients, they can get more symptomatic. So it's getting the

right sort of exercise program for them. The issue with surgery in hypermobile patients, particularly say if we're operating on the hip or if we're doing hip arthroscopy…because any approach to the hip joint will interfere with the capsule and the ligaments and the soft tissues, you can risk making an unstable patient more unstable. So it's very important that if they are unstable, you recognize that in advance and that you have strategies to deal with that. So we're quite conservative with patients who are hypermobile because we know that their recovery will be, I'd say on average, about twice as long of someone who isn't and their outcome will be less predictable, so one has to have that discussion with the patient beforehand. Having said all that, if you've identified specific pathology that normally gets better with a surgical intervention that you're recommending, that's no reason not to do it but it's very important to have identified the issues beforehand so that everyone's geared up to addressing them in their rehab phase afterwards.

APM: I hope that answered the question there. We've got some more coming in here and they're coming in quite early this evening, which is unusual. I think usually, they leave it to the last five minutes, we barely got time to answer them. Someone unnamed has asked whether you ever consider leg length inequality as an issue.

JW: So we do see leg length inequality. Now, often, again, it can be related to patients who've had previous hip pathology. The kinds of things that we see that in would be previous Perthes disease, slipped capital femoral epiphysis, that sort of thing. Now, often, leg length inequality can be addressed perfectly well with appropriate orthotics and then we don't need to get involved. So the main reason to get involved is if the joint itself is pathological and producing pain or if there are significant secondary effects to other joints such as ipsilateral knee and the spine but I would say that's something that happens very much later in life. So one wouldn't really address it unless you've got a major discrepancy. If you're talking sort of 3, 4 centimeters then that's a separate issue. If you're talking 1 to 2 centimeters then often that can be addressed with appropriate orthotics and then one deals with the hip pathology on its own merits.

APM: We've got a question from a physio, Ollie, in Cornwall who says that you did not look at lateral rotation in supine with the hip at 90^{o} and this is something he's always considered routine to assess for gluteal shortness. Is that not the case?

JW: Yes, so we do look at that. I was really largely focusing on the impingement points. So again, I think, you know, assessing rotation and extension…so we measure internal and external rotation, extension and flexion but I would say in the conditions that I deal with, it's the mismatch in internal rotation with regards to identifying the morphological abnormality of the acetabulum that actually provides the giveaway in terms of the conditions that we treat.

APM: We got a question from Matt in Liverpool who's asking about labral tears. Now, you did discuss this earlier on. You said that often, they're secondary to morphological abnormalities. What's the mechanism behind the labral tear itself and are there other…there must be other mechanisms as well. So —

JW: Well, would it be helpful to illustrate on a slide or shall we look at that?

APM: Of course, please, if you've got some slides that can do that.

JW: So perhaps we'll just look at something here. So if we look at…this is a patient who's got an aspherical femoral head. On the AP pelvic x-ray…let me just get this up for you and then we can see that more clearly. So the kind of things that we're looking at…obviously, you might just get a report that looks at the joint space width. Obviously, if the joint space width has decreased, that's an indication that someone's getting degenerative change and what we're more interested though is…because often, the joint space width won't be decreased. What we're really interested is in the shape of this hip. So if you follow this femoral head around, you can see that it looks spherical in this more medial area but then there's this big lateral bump. So what we really want is a nice circular femoral head but where you have this big bump coming out here, that's actually how the hip then gets injured. So what happens is that bump keeps rotating into the hip joint. Now, if we just move on, this is looking inside the hip. On the left here, you can see the femoral head. This is the time of the hip arthroscopy. You can see that the femoral head has been distracted. This is the central part of the acetabulum. Out here is the labrum and then this is the articular cartilage at the junction with the labrum, what we call the chondrolabral junction. Now that should be completely smooth. This is my probe. OK, this is the labrum here. That's the central cartilage. Now if you can imagine this aspherical femoral head, what it's doing is it's rotating into the hip repeatedly over many, many years, many activities and it's splitting the junction between the articular cartilage, which is here, and the labrum which is here and it starts to peel it off. It's a bit like, you know, once a carpet starts coming up, you know, it never sticks back down or like wallpaper coming off a wall. It starts to peel off and it's this delamination that's so destructive to the hip.

APM: So it's actually not the labrum. It's the junction between the labrum and the cartilage.

JW: That's what splits, yeah and then the damage, really is…so the split at the chondrolabral junction is where you get the pain. Then the labrum itself can become unstable but actually, the thing that makes us anxious is this articular cartilage delamination.

APM: It's looking very messy under your probe there.

JW: So that's bad when that starts to happen. Exactly, yeah.

APM: And so what are you going to do about this?

JW: So in this kind of condition, what we'll do, sometimes we'll need to trim some of the acetabular rim. We'd repair the labrum but more specifically, we would need to get the femoral head round again and we do that by, you know…again, during the arthroscopy, we can reshape the femoral head. We can see that it can rotate back into the acetabulum without causing an injury to the joint.

APM: One of our viewers has just asked if that bump is actually the cam lesion.

JW: That's the cam. Exactly right.

APM: It is and when you reshape it, presumably therefore, you are damaging that articular surface. How does that affect the function?

JW: It's what we call the peripheral compartment. So it's not the main, central part of the femoral head that's articulating with the acetabulum. So it's the non-articular part of the femoral head that shouldn't be actually articulating with the acetabulum but does because it's the bulky part of the neck. So that's where you should have good clearance and where that shouldn't be actually creating the contact with a joint.

APM: Somebody's now asked, "What percentage of slipped growth plates," and for a moment, the abbreviation escapes me but, "In adolescence leads to osteoarthritis later in life or can that not be reliably predicted?"

JW: Yeah, no. A slipped epiphysis—

APM: Thank you.

JW: --is a bad thing and we know that when you get a post-slip deformity, it causes very early damage to the hip joints. So often, these patients will be looking at hip replacements in their 30's or 40's if they're left with this deformity because the bump, they get this cam deformity effectively, is a very aggressive cam. It sits on the front of the femoral neck because the femoral head has slipped posteriorly and it's that that keeps rotating into the hip, causing the damage. So we know that a post-slip deformity is a very bad thing and does cause early damage to the joint.

APM: And not easily amenable to you reshaping them or —

JW: It can be helped with the reshaping but it's, you know…there've been quite a change in practice over the last 5 to 10 years in terms of how these are addressed and I think probably the pediatric surgeons who see more of these than I do are a little bit more aggressive in trying to get a better reduction of

the femoral head at the outset. It's a very difficult area and there are a lot of studies that are going on at the moment with a more aggressive approach to get a more anatomical reduction of the femoral head in these cases.

APM: And what about in Perthes disease? I mean which is necrosis, avascular necrosis. I mean what's the long-term effect of that? Do you see that?

JW: We do and so in these patients, again, they're often looking at a hip replacement in their 40's. Forties and 50's is very common for patients with Perthes disease.

APM: Does that depend when it was diagnosed and how early it occurred?

JW: No. I mean it depends to an extent on the amount of deformity that patients end up with and that depends on…patients who get their Perthes disease a bit later tend to have a less good outcome because there's less chance for the hip to remodel. It doesn't have the biological plasticity that patients have if they get it a little bit earlier.

APM: What's the typical deformity that occurs then or is there no typical?

JW: Well, you get the cam. Basically, you get a broad, flat, mushroom-shaped femoral head. You tend to get a trochanter that's much more proximal than normal. So not only can you get intra-articular impingement, you can get what we refer to as extra articular impingement where the greater trochanter can impinge on the side wall of the pelvis. And so then that's a whole sort of…in younger patients without too much damage, there are various strategies we have which we address that.

APM: Mary in London's asking how long it would take a labral repair to take.

JW: To heal?

APM: Yes, to heal.

JW: So when we repair, we normally stitch the labrum back with special anchors that cinch it back against the bone. By about 6 to 8 weeks, it's pretty robust, I would say. I mean it's pretty robust just with the fixation that we use. I mean we use a non-absorbable stitch. We firmly anchor it to the bone. So the rehab now is much more aggressive I think than previously. So labral repairs, we don't tend to protect too much. We get people, patients going through their range of motion and strengthening program pretty early.

APM: So you said a non-absorbable stitch.

JW: Correct.

APM: So that stays there forever.

JW: It stays there, yeah.

APM: No consequences obviously from that.

JW: No.

APM: And I better ask these questions before I go on to my own. Are your intracapsular injections always done under x-ray control?

JW: Yes. So we do them ourselves in the operating theatre under x-ray control. We don't like using contrast, largely because contrast itself can really irritate a hip. So some people can get so much reaction from the contrast that it masks the effect of the local anesthetic that we put in. So we do a non-contrast, under x-ray control. We do it a specific way and then we like patients to diarize their symptoms.

APM: And are some injections still done without x-ray control or is it now the universal standard?

JW: If you have a musculoskeletal radiologist that you use on a regular basis, they will do that under ultrasound guidance and that's another perfectly reasonable way of doing it.

APM: But we don't get injections, which are not guided any longer?

JW: Not into the hip joint.

APM: No, OK. Good. So I hope that's answered that question. A question from Ian in Notts. What's your opinion on pre-surgery manual therapy and whether…do you agree that ensuring good muscle function, strength and stretch before surgery leads to a better outcome in the affected hip?

JW: So I think, you know, prehab, as it were, is a very valuable programme for patients. I mean I think a lot of it will be to do with them knowing what they're going to have to do after the surgery as well. They find it, you know…if they can do the exercises when they've got a less painful hip in the immediate aftermath of surgery when everything's a little bit sore, if they've already gone through that routine, they do find the recovery much easier. There's no doubt they can start doing their exercises earlier. They know what they're aiming for. So it is a valuable contribution to the overall outcome.

APM: What's your relationship with the physios during the rehab? Do you tell them what they've got to do or do you just leave it to them to get on with whatever they feel is necessary?

JW: So we have guidelines with our physio protocols because I think one can't be too prescriptive because you don't quite know what they, you know…each patient will progress at a different rate. So I think it is important just to have guidelines or objectives of what you're trying to achieve at each particular stage in the recovery program. So for instance after arthroscopic intervention, we would tend to divide things up in the first six weeks, the second six weeks and then after three months, it's very much more focused in terms of that return to athletic activity and sports specific activity. So we chunk it up, produce some guidelines but obviously, each individual patient will progress at a different rate. So we rely on the therapist to identify the particular issues that they're having so that they can troubleshoot with the patient to overcome those particular issues.

APM: And are you able to give us an idea of what those chunks entail? What is the first six-week chunk?

JW: So after, for instance, arthroscopic surgery for someone who's had femoroacetabular impingement, the focus in the first six weeks is very much on getting their range of motion back. We know that capsular adhesion is a bad thing. So we like to promote range of motion. We do some early strengthening. We like to keep the weight off the hip a little bit.

APM: So the stretching is passive stretching by a therapist?

JW: Passive, yeah. And my preference is to use a lot of hydrotherapy. I think that's a very useful tool. We like patients to use a static bike early on. So a lot of the first six weeks is very much promoting range of motion, range of motion and movement, basically, to try and stop adhesion formation. Then the second six weeks will be very much, they'll have returned to normal, weight bearing and that's when a lot of the strengthening will commence and then pushing range of motion a little bit more at the same time. That's sort of how we chunk it up, yeah.

APM: Someone is going back to the leg length issue. How frequent is leg length discrepancy following hip replacement surgery and is some discrepancy inevitable?

JW: I don't think discrepancy is inevitable. So on the consent form, we always say that there is a possibility to have leg length discrepancy. I would say that it's rare to be…it would usually be less than a centimeter. Usually, if people are, you know, 2 to 5 millimeters different, they're not really going to notice it. What is important to recognize is that often, you can have an apparent leg length discrepancy. That is to say that when patients…particularly if they've had deformity before the intervention, they have a lot of muscle tightness, in particular, their abductor muscles. And so they can have a slight abductor muscle contracture or tightness after surgery, which will cause a lot of pelvic tilt. It'll tilt the pelvis downwards on the side that you've operated on and

that produces an apparent leg length discrepancy. Now, often, we can anticipate which patients are likely to experience that.

APM: Really?

JW: Yeah, depending on the kind of abnormality that we're addressing.

APM: I see.

JW: So certain, you know, hip conditions will…particularly the Perthes-type hip where we're going to be lengthening them a little bit anyway, their abductors will be tight. So if you warn patients that you will look and feel long for 2 or 3 months afterwards then they're less alarmed by how things are afterwards but it's very much related to the pelvic tilt and it's important to know when it's a true leg length discrepancy versus a muscle tightness and pelvic tilt, leading to an apparent leg length discrepancy.

APM: I've always found it difficult to establish a universal standard for measuring leg length. What do you do? You would take measure from the ischial tuberosity from the —

JW: Yes. So from the ASIS and it's, you know…you've got to, first of all, establish that the pelvis is square. So yeah, ASIS to the medial malleolus and your apparent leg length, we would measure from the xiphisternum to the medial malleolus on each side and then comparing the two but you have got to get the leg in the same position in relation to the pelvis when you're doing those measurements.

APM: There's a lot of variability there, isn't there?

JW: Clearly, there absolutely is, yeah.

APM: Ollie, our physio, has asked whether Perthes patients who undergo early hip replacement, assuming they're otherwise fit and well, can expect their hip replacement to last for life.

JW: Unfortunately, no one can say that they, you know…in a younger patient, say in their 30's or 40's or even 50's even maybe, you know, we cannot do a hip replacement that will necessarily last a lifetime. I think the issues that we've discovered over time relate very much to the moving parts, so the bearing surface. So it's that part of the hip replacement that can wear out. So, you know, it's like the mechanical part of any device, car engine or whatever, you know. A mechanical part will always eventually potentially wear out. I think the issue now though is we have some bearing surface, that's the articulating surface, that can actually last very well. Maybe I can illustrate—

APM: Please.

JW: --on a device. So a hip replacement, you know, consists of…I'm just going to show here…this is a short stem hip replacement that we tend to use sometimes nowadays in patients who have good bone but every hip replacement will have a femoral head. Because I do a lot of hip replacements in younger patients, I tend to prefer using ceramic as a bearing surface. Ceramic is a very hard material which has a very low wear rate and then it's coupled with a ceramic liner within a metal shell and then the two fit together like that and ceramic has such a low wear rate that in fact, even 15 or 20 years after a hip replacement has been in, on an x-ray, we cannot measure the wear. We can't see a change.

APM: So am I right in thinking that at the moment, that you don't have any evidence on which to base how long these are going to last?

JW: That's correct whereas in traditional hip replacement made of, for instance, cobalt chrome and polyethylene, we know that the polyethylene will wear out over a particular length of time and the issue with polyethylene was that, actually, the wear particles tend to cause quite a lot of damage to the bone. And so, you know, we can redo hip replacements, redo hip replacements. It doesn't have to be a very difficult operation. It becomes difficult when the actual bone mass that we're trying to put the implant back into has been very damaged often by the wear process. So if we can have a material that wears very slowly and that the particles that are released don't cause damage to the bone then there's every hope that actually, some of these devices will last for a very long time.

APM: What are your criteria in determining who is fit for a hip replacement? I mean is there upper age limit where you say, "Well, look, it's hardly worth us giving you one now," or would you say anyone who's fit and well —

JW: So I think it's very much sort of quality of life and how it impacts on quality of life. So, you know, mostly in terms of medical co-morbidities, I think we're pretty good at dealing with those for older patients. I do think that in younger patients, it's an issue, you know. We'll often have people seen by, you know, the orthopedic community or by their physios or by GPs who have a younger patient who's in awful lot of pain from an arthritic hip and they'll say that you're too young for a hip replacement and that's very difficult because obviously, you know, if you're in your 40's or 50's, you know, you still want to be active, you still want to be doing stuff but actually, an arthritic hip can be exceptionally painful and, you know, it can just take out your entire quality of life. So I think it's very much about quality of life. I don't think any of us feel that people should be sort of soldiering on until the bitter end, you know, stopping doing all the things they enjoy.

APM: Well, I have to say that…and I hate to drag this back to me but I mean that was the advice I was given over a knee replacement. It was only when the

pain becomes unbearable should you have your knee replaced. Well, actually, I put up with that and then the pain wasn't unbearable but I could no longer cycle. I couldn't bend my knee far up to cycle and actually, it's the best thing I've done is to have that replacement because, you know, it's as flexible as the other knee now and it's got me back to sports and other activities and failing to replace a hip in a patient who's got that sort of problem presumably is going to have all sorts of knock-on effects. They'll become less fit, maybe more sedentary, maybe more susceptible to other co-morbidities, if you like.

JW: It does have knock-on effects. Not only that, we also know that the stiffer a hip gets, the more waste the muscle gets around the hip. Actually, the recovery is much longer and actually, the level that people get back to sometimes can be limited. If the level that you intervene has got to such a low level then actually, that you're compromising their longer-term outcome.

APM: So what are the prehab measures that you would advice people who are going to undergo a hip replacement?

JW: So you have to take into account how much pain they're having. So sometimes, you know, patients will ask, you know, "Should I be having the therapy?" and I think it is helpful but it has to take into account what the comfortable range of motion is. So rehabbing a painful joint can be very difficult and sometimes, you know, almost impossible. So one then has to focus on some of the exercises they'll be doing afterwards, how they'll get mobile, use of crutches, looking at their home circumstances and those things may be more useful. So it's very difficult to really put an injured hip through a full program. It's just too painful and there's reflex muscle inhibition. So you have to be able to rehab those muscles without actually moving the joint too much and maybe a lot of static exercises, static work to be done but accepting that you're not going to be able to put the hip through much motion while you're trying to strengthen those muscles.

APM: A question from a viewer. If ceramic is the best replacement material available, does that mean it is now the only material being used and if not, why not?

JW: No. So I mean there's, you know…as every five years goes by, we get more and more information about the bearing surfaces we're using. There is a pretty good long-term data now on ceramic, which is spectacularly good. It is more expensive than some other bearing surfaces. Polyethylene, which is a plastic material, has improved in its quality and there are different types of polyethylene material now that are also showing very good longer-term results.

APM: Cheaper?

JW: Which are cheaper. So potentially, you could consider that older patients may be more suitable to a polyethylene type component that isn't going to wear out in their lifetime whereas a younger patient may require what we refer to as a hard-on-hard bearing. So there could be a degree of selection.

APM: Was it polyethylene you said earlier on that was leaving debris in the joints —

JW: Yeah. So now, we have what's called a highly cross-linked, irradiated polyethylene which actually is a much more…which is showing much better long-term survivorship and less in the way of particular debris that damages the bone.

APM: In that replacement, that device you've got there, what are the other materials? Is it simply surgical steel? Because some of it's shiny and some of it's dull.

JW: That's right. So I mean a hip replacement, first of all, that needs to be bonded to the bone. There are a couple of ways one does that. You might have heard of a cemented hip replacement. So cement can be used to bond the device to the bone. The cement is a grouting agent or broadly, you can use something called an uncemented hip replacement. If you look at this device, so you can see it's got this white coating. This is something that we call hydroxyapatite. That's the crystalline part that makes up our bone. It's calcium hydroxyapatite. So this has a coating on it that will bond to our own bone. You get a chemical bond with the bone and that's what we call an uncemented hip replacement. So you get a physical, chemical bond —

APM: Is that a stronger adhesion than would be with ceramic?

JW: With cement. Well, it's a very, very strong direct bond. So cement can't bond directly to either the bone or the implant. It produces a very tough grout, if you like. So it goes into the bony interstices and there are very good outcomes for cemented hip replacements as there are for uncemented. So it depends a bit on, you know, what we use, depends a bit on bone quality, bone anatomy and that's really how one decides what one's going to use.

APM: So if that was cemented, presumably, the bit that's implanted into the femur would be…it'd be full of holes, would it? In order to hold the cement.

JW: No. Actually, it's the exact opposite. So what we've learnt with devices that are cemented in the femur, they have to be completely smooth and shiny because otherwise, you get an…it must be allowed to have a sort of taper-slip shape and it has to be completely smooth, otherwise, you get very abnormal…you get debris of the cement from the implant. And so we know now…lots of lessons have been learned with what the coating on a cemented implant should be. They have to be completely smooth and shiny and they

have to have a very good cement mantle and then they can work perfectly well.

APM: Given either of those types of bond, how vulnerable is it to shaking loose for a want of a better expression, particularly if we were to do a high velocity technique on it for instance, walloping the joint.

JW: It's very robust. You can't debond it.

APM: So when you replace a replacement, are you actually having to remove that?

JW: So it depends why we're having to do the replacement. So for instance, if it was a cemented replacement that had been done 15 or 20 years ago, what can happen is that the particles from the polyethylene can creep down between the cement and the bone and can make the whole device become loose. And so then we're taking out the device; we're taking out the cement. Now, if it's an uncemented device, once they've bonded to bone, it's actually very difficult for them to come loose, short of having fractures. Infection is a reason we might have to take these out if something becomes infected. Very difficult to treat an infection with material in the bone. We have to take everything out, start again once the infection has been treated. So there are times when we have to remove these very well-bonded devices from the bone and that's definitely not easy. We have special tools to do that.

APM: But if the bearing surfaces have worn, can you replace it without removing that part of the —

JW: It's exactly it. So that's what I hope, you know, potentially, the future will be, that we'll be able to leave the devices that are firmly bonded in the bone and it may simply be a component part exchange and that's a relatively trivial procedure.

APM: But it's not done at the moment.

JW: Well, we're not seeing the reason to do it.

APM: Of course.

JW: But potentially, that's what one could do. For instance, I've exchanged, you know, polyethylene bearings into ceramic on ceramic, leaving the devices, the cup and the stem in the bone. So, you know, it is perfectly doable.

APM: There's a lovely simple mechanical question that's come in here. How do you get the metal part into the femur? The suggestions are hammer it in, screw it in or magic.

JW: So it's machining. So we have machine tools to shape the internal surface of the femur and that will allow us —

APM: Have you got a jig at the top of the femur which enables you to get the angles just right or…?

JW: No but we have devices that will be shaped like that. Phantoms that will be a similar shape to the device that we're going to put in with little rasps on and we would gradually rasp from a small size up to a size that actually fits and is tight before we then put the definitive device in.

APM: I once watched a hip replacement. It was a long time ago. I watched a hip replacement being done and the bit that goes into the acetubulum was a bit like a cheese grater that ground out that —

JW: That's right.

APM: Still the same thing is it?

JW: Yeah and I'll just show you what…so the acetabular component, you see. We would put a metal shell in. We would use something that would shape the acetabulum to this hemisphere. Then this would be put in extremely tightly and then the bone would grow into the back and then on the inside, you see, we would put…we will have a choice of different liners. We can use a ceramic one or we could put a polyethylene one. So there'll potentially be a choice of bearing surface that we can then put in.

APM: And how does that stay in?

JW: There's a special fit around the edge of the device that will take the liner that we put in.

APM: And I noticed that device is full of holes.

JW: Now, this, if you don't have very good anchorage —

APM: Show that to the camera so they can see —

JW: If you don't have very good anchorage, we could put screws through the holes, into the bone of the pelvis and that will secure it while the bone is…so the bone will grow into the device over a period of about six weeks. So you need to have a very secure fit in six weeks. If there's any micro motion then we get fibrous tissue and not bone growing in.

APM: I see.

JW: That's the importance of that.

APM: There's now no labrum, presumably.

JW: No. All of that goes.

APM: The size of the acetabulum and labrum, how is it ensuring that sort of stability?

JW: So the labrum is just a soft tissue suction seal around a native hip. It's not necessary…it would not have no function in a prosthetic hip.

APM: I see. Some more questions. The current thinking about bursitis, which we touched on earlier on. What is the thinking on incidence and treatment and is it true that it's more common in menopausal women?

JW: So I mean I do see it…I would say it is more common at…yeah, about 50, 60, 70, we see it. That would be a common age group. In the younger group, we see it in patients…often the hypermobile patients, patients who have a snapping iliotibial band. That can lead to bursitis symptoms. In the older group, we see it often, as I say, with a tendinopathy and it's the tendinopathy of the abductor attachment to the greater trochanter that sparks the inflammation, if you like, in the bursa. So it's like a rotator cuff tendinopathy, in fact, that we see around the hip. So it's like the same in the shoulder as it is in the hip and it's that cuff tendinopathy that actually is what's producing the pain and it's addressing that and usually, it's addressed with a conservative program, a lot of stretching and strengthening of those muscles and they all would be rather rare for us to have to intervene. The times that we intervene is when people have a large tear. If they have a large tear leading to a lot of pain and weakness then just like repairing a rotator cuff in the shoulder, it could be very effective doing that in the hip.

APM: A couple more. Mark in London, I'm saving your question for a minute because I know there's some quite interesting slides on this to be seen but one from Katie in Bedford, another osteopath, who apologizes being late joining the broadcast. Glad you could join us, Katie. She says, "Have you ever done the new SuperPath hip procedure?" And whether that's something that might come into the NHS in the future. After having a patient having it done at Rugby Hospital, the rehab was amazing, apparently. You better explain what it is because I don't know.

JW: SuperPath is a different type of posterior approach. It's done more from the top of the gluteal area. It develops the interval between the abductors and the piriformis. So there's a lot of interest in producing less invasive approaches to the hip joint. We alluded to earlier that I prefer using what's called a direct anterior approach, which, again, is a less invasive approach. I mean I can just show you the access that we get. You might be interested to

see since we've gone on to that particular topic. If we look here, for instance —

APM: If you leave it like that, that will be fine because Holly would've selected that bit of the screen.

JW: So here, you can see this is how we have a patient set up for a direct anterior approach. We tend to use a skin crease incision in the groin and actually, that's the access we get. We have retractors. That inside there is the acetabulum. So that's actually where we're putting the component that we were looking at. So this is the component. That'll fit into that small hole. So this is…again, it's a minimally invasive approach. Here, you can get a bit of a bigger view into the acetabulum just so that you know where we would be. This would be the head up that way, foot down that way. This would be rectus femoris in that direction and tensor fascia lata in that direction and this is the bottom of the acetabulum here. We've already removed the femoral neck. Here, we're, again, looking at the…into the acetabulum and this is what hips look like. This is a small groin crease incision. This is a young girl who had juvenile arthritis, in fact and this device here is actually similar, you know…what you're looking at is this that we were discussing, the short-stem device. So, you know, there is a lot of interest in less invasive approaches to the hip joint. I think one shouldn't escape from the fact that what's most important is that the hip is put in correctly and, you know, the bits are pointing in the right direction and if you can do that in a less invasive way, it does make the rehabilitation of the patient easier.

APM: A question here from Ollie again or I presume it's the same Ollie, apparently we haven't covered this, do you deal with Gilmore's groin injuries? Again, and do you have a clinical assessment test that you trust —

JW: So I don't. I mean so it's important to recognize when there's a groin hernia type problem. This is where patients have…so exactly what the pathology is with a Gilmore's groin is a little bit disputed. So often, it's felt to be a direct inguinal hernia. Other times, it's related to the attachment of the inguinal ligament to the pubis.

APM: So what's meant by Gilmore's groin?

JW: Well, I never operated with Jerry Gilmore who actually invented that particular operation. We call it a sportsman's hernia. Most people nowadays who deal with these hernia type operations are dealing with a small direct hernia with a weakness of the abdominal wall. That seems to be the pathology that they're dealing with. The tendonis and the finding is very different from hip joint pathology but you can get pain radiating down the adductor region, for instance, and radiating up into the lower abdomen and that's where the hip injections and other injections are important to deal with.

APM: You talked about leg length discrepancies earlier on. One of our viewers wants to know what would you do about leg length differences of over four centimeters.

JW: So it depends where the abnormality is. Is the abnormality in the femur? Is the abnormality in the tibia? It's very difficult for someone to manage with such a significant leg length discrepancy. It depends on the age of the patient. It depends on the pathology that's producing it but sort of patients may have correction of that, there are limb lengthening procedures that can be done, depends on the age. One sometimes will address the other limb. One can even stop growth on the other side to even things up. So, you know, I can't give you a very specific response to that but it's obviously important to be clear as to why the leg length discrepancy developed in the first place and, you know, age of the patient is a very significant factor.

APM: And the age of the patient, presumably, will also affect the likelihood of osteoporosis. How does that affect what you do?

JW: It affects the kind of implant choice when we do hip replacements and that sort of thing. When we do somebody…osteotomies, what I mean by that is when we do operations where we're cutting the bone and moving the bone into a new position. In older patients who have some osteoporosis, that sort of procedure may not be so suitable because it's physically more difficult to hold the bone. I think when it comes to joint replacement, we're often dealing in the older age group with osteoporosis. It's definitely a big issue. We use different implants. We use different modes of fixation. All those things have to be taken into account. Post-trauma cases, it's very important to recognize osteoporosis. Patients commenced on treatment where it's necessary or at least to stop osteoporosis from getting worse so that their skeletal bone mass could be stabilized.

APM: In those elderly patients, I mean is it relatively easy for a fracture to go undiagnosed?

JW: Not infrequently. I mean we often see stress fractures that can occur around the pubic area, proximal femur. So that's definitely something that's recognized and it can be quite difficult to diagnose but with MRI, bone scans, that sort of thing, it's having an index of suspicion I think that's important.

APM: What would you lead you down that route? You said stress fracture. I was thinking of impact but is it just pain that isn't resolved by any of the other conservative treatments or…?

JW: I think it's obviously what, you know…the kind of impact or if there had been any trauma that brought it on. If there's no history of trauma and patient has a history of osteoporosis or if they've been on osteoporosis treatment for a

long time, so some of the…for instance, alendronates and that sort of thing that patients have been on for a very long time, we know, eventually, starts to cause bone weakening and they can actually predispose patients to stress fractures. So I think taking their history is very important whether patients have been on medication for a very long time because we're seeing some stress fractures arise for that very reason.

APM: That's curious, isn't it?

JW: It is, yeah.

APM: I mean the drug that's there to prevent, overcome problem of bone weakening —

JW: The bone remodeling gets so disturbed over a long period of time, yeah.

APM: I'm going to come on to that question from Mark. There are a couple of others as well but he asks, "Do you have a favorite hip replacement procedure?" And I thought you probably want to talk about periacetabular osteotomy at some point and do you think that hip surgery has changed much over recent years or will do in the near future and some of that, you've already covered.

JW: Yeah. No, I think the whole area of hip preservation I think, you know…I like to try and be involved in hip preservation procedures. I mean I think it is very important we get really good outcomes particularly when we see patients before they get degenerative change. That is just so important that these things are recognized because once someone has degenerative change then joint preservation procedures are much less effective. So it's very important that we have, you know…everyone understands that this is what we're looking for, you know. If there is a young patient who has persisting symptoms then we want to try and recognize these things.

APM: It's difficult though, isn't it? Particularly within the NHS where people are desperately trying to save money, referring people for MRI or MRA and interesting to know, do you think MRA is becoming more common now given what you said earlier on that it's a good diagnostic tool for labral problems?

JW: I mean I think again, I think it's just having the right report, you know. Often an x-ray is all that's needed, to be honest. I think a lot of MRIs are done unnecessarily and a lot of the reports can be rather misleading without taking into consideration the finding on an x-ray but, you know, I think we, you know…there are a lot of MSK groups. A lot of patients will come through MSK triage before they come to see us. I think a lot of our therapists are very expert to actually recognizing these conditions now. We rely on them a lot. They realize, after a period of time, if someone has been battling away with conservative treatment for 2 or 3 months and things aren't improving, they

understand that it's very important to get a clear diagnosis so that we all know what we're trying to treat and I think that kind of understanding is terribly important.

APM: Would you like to talk about PAO for a little while? I know you've got some slides, which I found quite extraordinary when I saw them earlier on.

JW: So I mean perioacetabular osteotomy, that's a technique that we use in patients who have a dysplastic hip. So in a symptomatic patient who has underlying hip dysplasia, they'll often come to us with activity-related groin pain.

APM: So we're talking about a shallow acetabulum.

JW: Shallow acetabulum, yeah.

APM: Which, presumably, in years gone by, would've been treated with a replacement, would it?

JW: So ultimately, those patients would develop osteoarthritis and then that would end up with a hip replacement. In years gone by, often patients might have undergone a proximal femoral osteotomy to try and compensate for the shallow acetabulum. The results of proximal femur osteotomies for dysplasia hasn't been terribly good but that would be very much…it's in the older literature because it's a slightly easier operation to —

APM: So if you're doing an osteotomy to the femur, what actually are you trying to achieve?

JW: So you're actually making the femoral neck more varus so it points more into the acetabulum. So you're creating a deformity elsewhere to compensate for a deformity on the acetabular side. So often that can then cause problems when we…then ultimately have to do a hip replacement and that sort of thing.

APM: Sounds a lot simpler than what you do then.

JW: It's simpler but actually, it doesn't address the primary deformity and hence, it's not so effective. So the acetabular osteotomy is a much more effective procedure for dealing with the dyslplasia. It allows us to get the parameters correct. I can just show you maybe on a schematic. We'll just try and bring that up.

APM: So if I…

JW: There we go. So we're just going to get this one. So if we look at this particular example, here we can see there's a femoral head. This is a 3D CT. I

use a lot of CT to analyze hips. This is a 3D CT. This is the femoral head. That's the —

APM: Oh, this isn't just a schematic. This is a real hip —

JW: This is a real hip, yeah. And basically, there's much too much of the femoral head that's visible. So the acetabulum should be covering much more. If you look up here, it says, "Coverage, 59.7%." Now, a normal hip, the acetabulum should cover about 75% of the femoral head. So you should only see about…this top area, you should only see about 30% of the femoral head. So it's much too shallow. So with the operation, what we do, we make some cuts around the acetabulum more or less shaped like this. Not quite like this because this is an animation on the CT scan but what it then allows us to do is move the acetabular fragment. So you can see that it can move. So this is actually what we do at the time of surgery. We bring it further over the acetabulum like that. We bring it in this direction. Actually, more in that one. So we bring it over the top. Now, can you see how that's different? So there, the acetabulum is now sitting over the femoral head. If I look at this number here, it now says 75%. So now we have a femoral head that's now covered by an acetabulum, producing, you know, almost normal support for the femoral head and then what we do once we move the acetabulum like that and we hold it there with some metal work, that allows us to mobilize the patient and for the first six weeks, we have to restrict weight bear because we've created a fracture and that has to be allowed to heal but this is a really effective technique for improving symptoms and getting patients —

APM: What about all those new irregular edges of bone that have suddenly appeared there?

JW: Well, yeah, the skeleton's a wonderful thing. It's not like carpentry in that everything fills in. So, you know, we can afford to leave gaps and spaces because actually, everything fills in with callus and new bone. So we're very fortunate the pelvis remolds extremely well. It's a very vascular bone. So there's rarely any problem with bone union. And so, you know, once we've got it in the right position, it'll go on and heal and then that will, you know, protect the hip and make it function better for generally a pretty long time.

APM: Have you got a lifetime for that sort of operation before you need to do something else?

JW: So in general terms, in a patient who has no osteoarthritis, before we do this type of surgery, they would normal expect to get 15 years to 20 years out of their hip before potentially needing a hip replacement. If they've already got some arthritis changes then that does come lower. So it depends on what your starting point is. Yeah.

APM: And might you later on carry out a hip replacement on that —

JW: That's correct. So these types of surgeries don't prejudice having a hip replacement in the future. In fact, often, they make it more straightforward because the acetabulum is in a more optimal position. One may need to do bone grafts and things less frequently when the acetabulum is in the correct position.

APM: Well, I think that certainly answers I think at least part of the question that came from Mark. I don't know if it's your favorite hip procedure but it's certainly a new development, isn't it?

JW: It probably is, yeah.

APM: That's quite an extraordinary one for someone who's never seen that before.

JW: I mean so it's not a thing that is…the operation itself is not something that we've developed. This is something that Professor Reinhold Ganz in Switzerland originally developed. What we've done is we've been able to do it through a minimally invasive approach, which I think has made a big difference to how patients, you know, feel about the whole surgical impact.

APM: And once again, that will be surprising that you can cut so much of the pelvis through a minimally invasive —

JW: Correct, yeah.

APM: Very reassuring. It also raises a question that someone else has just sent in which is, "Would you always replace ball and socket in the hip replacement or can you do one without the other?"

JW: So, you know, you always have to do something on the socket side. So the days where we used to just do a cap on the femoral head, we know isn't as robust as relining the socket and doing something on the femoral head as well. So you always do have to do both.

APM: Now, this next question that's just come in is about resurfacing which you hadn't mentioned until now and is that now the technology which is on hold or discarded?

JW: So yeah, resurfacing has become much less common. What we have identified is there are certain groups that still can do well with resurfacing. They tend to be larger males where they have a particular size to their hip and they…size and shape and they can still do well with a resurfacing type replacement but we know that other types of hip morphology are less suited for the resurfacing.

APM: What's involved in the resurfacing itself?

JW: So the resurfacing is still a hip replacement. Just to illustrate on this model for instance then, what would happen in this case here will be that a cap will be put, a metal cap will be put on top of the femoral component, on top of the femur and that you'd have the socket relined with a metal shell. So it's still a hip replacement but more of the femoral head is retained, if you like, with a metal cap put on it and the issues that maybe everyone is familiar with, there had been problems with a metal on metal reactions which have, you know…some patients have had very bad outcomes from that but we do know from the registry data, we do know from many individual publications on resurfacing that there are certain sub groups that can still do well with that procedure that I would say that, you know, it's not done very frequently anymore.

APM: A few more questions have come in while we've been talking. Why is an x-ray adequate for labral tears? Do they not miss tears? It's helpful for us if they're adequate as we're more likely to get GPs to do them.

JW: So it all comes down to…maybe I can just show an x-ray and then we can just go back to that.

APM: Just go back to those slides.

JW: And so we're just going to talk about an x-ray, things that we're interested in looking on an x-ray. Let me just find this for you. So when we look at an x-ray, the points that we want to look at are, for instance…can you see this line here? There's a vertical line and a line to the edge of the acetabulum. Now that, we call a center edge angle. Now, that should measure about 25^{o} to 35^{o}. If you look at that particular x-ray there, that would be about 10^{o}. So if you make that measurement, you'll recognize a dysplastic hip when there is one. Now, if you don't take that x-ray and you do an MRI scan of that hip, you may well pick up a labral tear but it won't tell you why the patient has a labral tear because often just with the sections on an MRI scan, people often won't realize that the underlying problem is the dysplasia whereas it's all very, very obvious on the plane x-ray. Now, a lot of times on…if you get a standard MRI scan, you'll often see that there's a report saying there's an anterior-superior labral tear. There also happens to be a normal sulcus anteriorly between the labrum and the acetabulum, which is anterior and superior. So a lot of times, what's reported as a labral tear is probably a normal variant that we see in the hip. So unless you have an MR arthrogram with a particular sequence then you can't necessarily diagnose a labral tear from a standard MRI scan.

APM: I see.

JW: Now, if it's a 3T MR…so a lot of the stronger magnets now have fantastic resolution and I think you can diagnose labral pathology from a 3T MR without contrast but most will be a 1.5 Tesla MRI scan. Most won't have a

dedicated hip protocol and it's those that, you know…it may say labral tear but, you know, whether there is or isn't, I would say you can't necessarily be sure.

APM: And do you think that they're…we're always talking about MR scanning, diagnosing, prolapsed discs in people who've got absolutely no symptoms, whatsoever. Would that be the case in the hip as well? There may be millions of people with labral tears, which would show up or be diagnosed as labral tears under MR —

JW: That's a very good point. So in patients who have degenerative hips, for instance, who have osteoarthritis, we'll often see patients had an MRI scan then there…lots of labral pathology. There's edema. There's bone edema and in fact, if you looked on the x-ray, it would be osteoarthritis. So there's a lot of labral pathology that one gets with degeneration. There are a lot of symptomless patients in their 50's who will have labral pathology and it won't necessarily be relevant to what they're complaining of. So I think —

APM: Is that why? Do you think a GP would think…if someone's got a hip problem, would a GP think to say, "Well, it's x-rays we need, not a magnetic imaging"?

JW: Well, then we get to having the x-ray reported correctly. So, you know, as I mentioned before, often, the report will focus on whether there's arthritis or not. So, you know, if you've got a 20 to 30-year-old, there are some patients who, you know, will have arthritis at that age but actually, a lot of them will have these conditions. So, you know, coming back to this x-ray, you know, a radiologist will say, "That's a…" They might say that's normal because there's an absolutely joint space width. Hopefully that wouldn't be the case on the right side. You can see over here there's a very large subarticular cyst. The other thing we look at is the…this line is actually along what we call the weight bearing zone which is like the little sclerotic eyebrow that sits on top of the femoral head. If that's very steeply sloping, upwards and outwards, that means that it's, you know, not…it needs to be horizontal. That line should be horizontal. That's another clue to there being an abnormality.

APM: So that line there is far too steep.

JW: So it's very steep, yeah. So the center edge angle and that line being very steep are the key clues to there being an underlying dysplasia. And then you saw the x-ray of the aspherical femoral head, you know. This one, the big bump, you know, that's the key to there being an FAI type problem.

APM: We're got time for probably a couple of other points here I think. This one's quite technical. What are your thoughts on using high intensity class four laser for pain relief for hip OA or reducing inflammation from other pathologies?

JW: I have no experience with it and so I wouldn't be able to comment, I'm afraid.

APM: That's a nice quick answer. We like that. Are there any studies on stem cell treatment for hip joint osteoarthritis? That's from Alexander Malkani.

JW: There's no evidence that stem cell therapy works. So I think patients who are having stem cell therapy should be part of a controlled trial. So there's no role just out of the blue for having stem cell therapy. If it's being done, it should be done as part of a controlled trial. Now the other work going on is to whether some of the cartilage replacement scaffolds for instance that have been used in the knee. Now, there's some work being done in the hip joint and again, I think the jury is very much out as to whether the cartilage scaffold techniques are going to be helpful for preserving hip joints that have already become osteoarthritic. So right now, there's no evidence to support the use of those particular strategies, in particular, stem cell injections.

APM: Two related questions, possibly the last question, I'm afraid, first, do you ever come across femoral neck stress fractures and do you have orthopedic tests to indicate that sort of injury or a loose implant?

JW: So I think for the stress fractures, it's very much in the history, you know. Has someone suddenly increased his or her activity level prior to this happening? It usually happens in a particular population, often-thinner females who are doing an awful lot of running. Loose implants, again, that's sort of weight bearing pain. So if you have a loose hip replacement then it's weight-bearing pain that is the giveaway.

APM: We've come to the end of our time. We always wonder when we start these broadcasts whether we'll have enough to talk about to fill 90 minutes and we've had a fantastic amount of information from you and I'm sure we could've gone on for a lot longer. It's been a real pleasure and privilege to have you in here this evening, Johan. It's been a really interesting talk and I've had a number of comments come in, saying it's been a fantastically useful talk as well.

JW: Good.

APM: So thank you very much for that.

JW: You're very welcome.

APM: One of the questions is can we refer people to you privately and of course, I can put details of your website up on our website afterwards. So —

JW: Yes, so either private or NHS is absolutely fine.

APM: And you work at UCL in London.

JW: That's correct.

APM: Well, thank you again.

JW: OK.