

Dr. Andrea Spiker:

Welcome everyone to the Arthroscopy Association's Arthroscopy Journal podcast. I'm Dr. Andrea Spiker from the University of Wisconsin. Today, I am joined by Dr. James Wylie, who is the Associate Medical Director for hip and knee preservation and Director of Orthopedic research for Intermountain Health in Salt Lake City, Utah. Dr. Wylie was the senior author of the article titled "Combined Borderline Acetabular Dysplasia and Increased Femoral Anteversion is Associated With Worse Outcomes in Female Patients Undergoing Hip Arthroscopy for Femoroacetabular Impingement," which was published in the April 2023 edition of the Arthroscopy Journal. Dr. Wylie's co-authors were Jennifer Marland, Brandy Horton, Jason Smythe, and Hugh West. Welcome Dr. Wylie, and thank you so much for joining us.

Dr. James Wylie:

Yeah, thanks for having me.

Dr. Andrea Spiker:

So Jim, can you tell us about yourself and your current practice?

Dr. James Wylie:

Yeah, so I'm about five years into practice. I, like you, did orthopedic residency, did a sports medicine fellowship, and then did a second year of hip preservation fellowship so that I could do comprehensive hip preservation surgery. I do rotational osteotomies, periacetabular osteotomies, hip arthroscopy, kind of anything in that non-arthroplasty world kind of, but not the Peds world. Then I also do knee, so I do a lot of knee osteotomies, cartilage work, ligament work, meniscal stuff. I'm probably about 60% hip and 40% knee. Kind of varies depending on the week. I don't do any shoulder or elbow or anything like that. Then I help manage our research program, and I do some administrative work for our system, which is now a 35 hospital, 400 clinic system across five states. So, a lot going on there.

Dr. Andrea Spiker:

Yeah, I can imagine. Well, that's fantastic. Yeah, I love your practice makeup. I agree. It's living the dream of hip and knee preservation surgery, which is awesome. So Jim, the paper we're discussing today sought to determine the relationship between increased femoral anteversion and borderline dysplasia in a female cohort of patients. Can you start by telling us why you decided to look at these variables, and why female patients in particular?

Dr. James Wylie:

Yeah, so as someone who sees a lot of hip patients, a lot of young hip patients, my decision point and my thought process about these patients, the first kind of fork in the road is always are they male or female? As you probably know from your practice, it's almost like dealing with a different joint, dealing with a female hip compared to a male hip. You kind of go in with maybe 50/50 instability versus impingement in the female group, where you're probably 90% impingement in the male group, 10% instability. Part of this was Jenny Marland, who's the first author on the paper. She is a hip preservation patient in the past, and she's a physical therapist, and she started kind of this journey with Dr. West probably in 2008, when he started doing hip arthroscopy. The females were of more interest to her, partly because she was the patient.

When you think about a female hip versus a male hip, I think looking at the outcomes, it's much more important to look at it on sex specific outcomes because like I said, when you're evaluating these

patients, they're almost like different kinds of patients. Then as far as the variables, what we're always trying to figure out in hip patients, is it instability or is it impingement, or obviously in older patients, is it arthritis? But those of us that deal mostly with young patients, it's about deciphering which one of those it is. There's a couple papers from this cohort. This paper looks specifically at the femoral anteversion side of it, and looking at kind of borderline dysplastics versus non-borderline dysplastics. A prior paper in AJSM, we actually looked at the FEAR index and the anterior wall index, so kind of other variables.

If your first screen for borderline dysplasia is a lateral center-edge angle under 25, then kind of what else can you add to that, that pushes you towards instability or pushes you towards impingement. In this cohort, we were kind of looking at the other secondary measurement variables that you can use to determine whether someone's unstable. On the other a AJSM paper that we published, we looked at an anterior wall index of less than 0.35, or a FEAR index that opened laterally. That, along with increased femoral anteversion, were three variables that kind of pushed us more towards an instability diagnosis. That's where we broke this up, based on these variables.

Dr. Andrea Spiker:

Well, I certainly applaud you for focusing on the female patient cohort. Even within your paper introduction and discussion, you mentioned some of these prior studies that really have had some mixed results related specifically to femoral anteversion and outcomes after hip arthroscopy. But just as you mentioned, there's so many certain aspects of the female hip that are different than male hips, including that higher likelihood of anteversion of both the acetabulum and the femur, the higher likelihood of ligamentous laxity. I really like how you think of it as almost a completely different joint. It's interesting. I mean, do you think of... We've both been through sports medicine fellowships separate from hip preservation fellowships. Do you think that there is any other joint in the body where we approach it on such a sex difference as we do the hip?

Dr. James Wylie:

I mean, I think maybe some patellofemoral stuff in the knee. Males are more commonly traumatic patellofemoral instability and females are more commonly probably kind of atraumatic. Due to whether it's anteversion, or ligamentous laxity, or whatever other variables are driving that. But I think the hip is kind of unique in the sex differences. Like you talk about with some of those prior papers, if your selection process for patients for arthroscopy is biased towards say, doing males, then you retrospectively look at your cohort of patients and you say, "Well, I did all these borderline dysplastics and they all did fine with arthroscopy." Well we have a lot of those patients are male and don't have these secondary markers that push you to a more unstable hip, then potentially that paper says that borderline dysplastics do fine with arthroscopy, but there's a bit of a bias in the patient selection that pushes you towards more of an impingement hip than an unstable hip. That's kind of why we wanted to look at all these different variables that push you in the other direction towards more of an unstable hip.

Dr. Andrea Spiker:

It comes at a good time as well. I think a lot of these bigger cohort studies have been showing that more and more of the numbers of patients undergoing hip arthroscopy tend to be predominantly female. I think it's really important, as more of these more patients are female, that we really understand the nuances of the female hip.

Dr. James Wylie:

Agreed.

Dr. Andrea Spiker:

So can you tell us a little bit more about how you personally evaluate for borderline dysplasia and femoral anteversion in your practice? You mentioned a couple of the other radiographic indices that you use, but tell us a little bit more about your clinical evaluation and how you determine that instability versus impingement when that patient walks in your clinic door.

Dr. James Wylie:

Sure. I mean, I think with any patient evaluation, it starts... They walk in. You get a history. Is it the patient that can't sit in a desk, or has problems being on an airplane, all sitting squatting type complaints, or is it the patient that has a lot of pain standing for long periods of time? Running is a big issue. Kind of these weightbearing, kind of hip and extension type activities. Potentially, that might be more... I mean, the hip can hurt in doing anything, but is that pushing you more as a thought process of, "Oh, is this an instability?"

Then as you move into the physical examination, I get them supine with their hip at 90 degrees of flexion measure, internal external rotation. I also always get them prone and do internal external rotation, as far as range of motion. If someone is probably under 20 degrees of internal rotation inflection, then it makes me start thinking maybe this is an impingement hip. If I get in there and they have 50 or 60 degrees of internal rotation, I'm thinking they're probably an unstable hip, even if they're "impingement test or fader" is positive. When they have a really excessive internal rotation, say over 40 or 45 degrees, it starts putting instability on my radar, as far as how I work through my examination. I do a fader looking for that interarticular pain, and then I do the apprehension test where the other side is flexed up to the chest, and I kind of drop the affected side off the table.

I ask the patient two questions. I ask them if it hurts, where does it hurt? You're looking probably for articular pain hurting in the groin area, hopefully. Then I'm also asking, like when you do a load shift or an apprehension test in the shoulder, I'm asking, does this make you feel apprehensive? Do you not want this in this position? Do you feel like... It's not like a shoulder that, God forbid you dislocate someone's shoulder in the office, but people get that sensation or they get squirmy on the bed and they're kind of just uncomfortable putting in that position, that can give you an idea that maybe this is a instability situation. Then obviously, some of these patients come in having had prior surgeries and in the history part, understanding what they had done, if they've had a prior arthroscopy, hopefully having records or maybe they bring their pictures, and understanding was the capsule closed? Obviously, these are things that can contribute to an unstable hip.

Then, of course we all do the imaging first and measure everything so we have an idea of what we're thinking before we go in, but moving on to imaging, I start with the lateral and anterior center-edge angle. We get a standing AP and a false profile on everyone and I measure it to the end of the sourcil, not the end of the bone. If you have that kind of thick sclerotic area that comes out and then it kind of goes away as sclerosis but then goes further to the back wall, I don't really count that non-sclerotic area. Me and Travis Mack wrote a paper about that, God, probably five or six years ago now, where we correlated it to CT.

In an anteverted hip, when you measure all the way to the bone edge, you're actually measuring more posteriorly as you get out back to the posterior wall, so you want to measure it to that sourcil edge. That sourcil edge gives you about the 1:00 position, if you think of 12:00 as neutral, and then 1:00 as that anterior area so you're truly measuring that kind of anterior lateral coverage. Then on the false profile, I again measure it to that sclerotic sourcil. Like I talked about, are they male or are they female? Then what's their lateral center-edge angle? If it's under 25, it starts putting... Under 20, definitely that's kind of dysplasia until proven otherwise. That 20 to 25 borderline range, kind of thinking about putting on

that borderline kind of area. Now starting to think about in the measurements what else is going on with this hip. Then anterior center edge, if they're 23 on their lateral center edge, but they're 14 on their anterior center edge, again. That's pointing me more to an unstable hip.

Then the other measurements on the AP, I normally measure the anterior wall index, the posterior wall index, and a low anterior wall index is again, a sign of that anterior under coverage. Obviously, some people have borderline dysplasia but are retroverted on the socket, so they have posterior wall index deficiency where the anterior wall index should be about 0.4 in a "normal hip," and the posterior wall index should be about one. All of those things, I'm starting to formulate in my head, the lateral center edge is 21, the anterior center edge is 20, the anterior wall index is 0.2. All of those things are pointing me towards an unstable hip. Then obviously during the physical exam also, the Beighton criteria. They have 9/9 Beighton criteria, you almost have to prove to me your impingement because I find those patients don't do as well with arthroscopy.

Then the CT generally comes later. I don't always get a CT. I would say the vast majority of the borderline people I'm considering doing a PAO in, I do get a CT, just because I think the anteversion helps you... Again, if their anteversion is three degrees, you're probably going to pick that up on physical exam, but if an anteversion is 30 degrees, those are both ones that can point you towards an impingement hip or a unstable hip. So the CT generally would come probably... Maybe you send them off to PT, get their pelvis stable, get them strong, see if that helps, injection to make sure it's interarticular pain. Then I kind of say, "Hey, if you do these things and you're not feeling better and you're frustrated," I would normally get an arthrogram and a CT scan before the next visit when they come back and they would call in, say, "Hey, I'm not doing well. Can you order that imaging?" Then they come back for the next visit, and then you start adding those CT parameters to whether it's femoral anteversion or acetabular anteversion that start helping you figure out whether that's a stable or an unstable hip.

Dr. Andrea Spiker:

As you describe it, it all makes sense to me. On the other hand, I'm also thinking, wow, this has got to sound very complex to somebody who may not do all that much hip.

Dr. James Wylie:

Sure.

Dr. Andrea Spiker:

I was thinking that both you and I did the sequence of a sports medicine fellowship first and then a hip preservation fellowship. As you were describing all this, I was thinking what changed because myself, I did hip arthroscopy and hip in my sports fellowship, and then suddenly doing a year of that hip preservation fellowship, what were the things that I added? I think you mentioned a lot of them. I think the prone evaluation of a patient was something I added, and then probably about 10 more radiographic measurements that I added from what I did from sports fellowship. But would you find that that's your experience too?

Dr. James Wylie:

Yeah, I mean I went the University of Utah for residency, so I was a bit fortunate in that I had Chris Peters and Steve Aoki as kind of mentors on the residency side, so I think I got a little more nuanced understanding of the hip and Andy Anderson's there doing all his three-dimensional modeling, and biplane fluoroscopy, and all those sorts of things. I think I got a bit more of a nuanced understanding as

a resident. But yes, I went off to my sports fellowship and it was kind of like, "Oh, this is the alpha angle, and they have a positive fader, and their center edge is over 20, so they don't have dysplasia, so this is an impingement case." But I think... Yeah, and then you go off and you start thinking about all these other things, and then it almost makes it more complicated.

Dr. Andrea Spiker:

Exactly.

Dr. James Wylie:

Where you were like, "Oh, this was easier, I thought before." But I think it's because in the long run, hopefully it helps you take better care of those patients because you're actually understanding the hip better.

Dr. Andrea Spiker:

Right, and I think papers like the one that you published, really spell it out for us so that you can say in female patients who have borderline dysplasia, those are the patients that you look at their anteversion and consider this before you indicate them for hip arthroscopy. I think we're getting there. We're simplifying it along the way, but that's great.

Dr. James Wylie:

I think another take home you can take from the paper, when we looked at the patients that had a lateral center edge over 25 but had high anteversion, they did really well with arthroscopy. If you have the socket that makes it so the hip isn't an unstable hip, your center edge is 30, and yes, you have, say 28 or 30 degrees of anteversion, but you have the CAM, this paper also suggests that those patients are going to do okay with arthroscopy because they have the socket that can make their hip stable.

Dr. Andrea Spiker:

That's a great point, and that's very helpful information too because I think other studies have brought that into question. So back to this study a little bit more. Once again, the results showed that female patients with borderline hip dysplasia and increased femoral version had worse outcomes after hip arthroscopy for femoroacetabular impingement. You mentioned that those with normal acetabular coverage had more normal results, even if they had increased anteversion. Given these findings, how are you now counseling your patients with borderline dysplasia and femoral anteversion?

Dr. James Wylie:

Yeah, so I would say more of these patients at this point get a PAO in my practice. Then there's the question of, well if they have borderline dysplasia and femoral anteversion of 30, when do you do the socket, and when do you do the femur, from a rotational osteotomy standpoint, and when do you do both? My general experience, and I think all of my mentors and many of my colleagues like you, is that the PAO has the most powerful way to make the hip stable, and that it seems to have the most predictable outcome, as far as surgical outcomes. Obviously, we didn't look at that in this paper. We have a pretty big cohort of borderline dysplastics that got arthroscopy, and now developing pretty big cohort of borderline dysplastics that are getting PAO. So potentially in the future, we may hopefully be able to match these patients together and do a bit of a comparison.

But in my practice, if you're a borderline dysplastic that we look at all these other factors that we discussed before and it feels like your hip is an unstable hip, then I mean. I do 40 or 50 PAOs a year. I'm not afraid to just say, "Hey, I think the best surgery for you is a PAO." Now I've also, when you have the PAO discussion with patients, some patients look at you sideways and say, "Oh, my God. I'm not going to let you do that." In this group. Maybe not that hit all of the predictors of poor outcome, but in the borderline dysplastic group, I also sometimes have the discussion. The patient gets a say in what they have done, so we have a long discussion and I say, "I think you're probably best stabilizing your hip."

Now probably half of my PAOs get a scope at the same time, so if they have an alpha angle of 60, and some labral stuff, and their borderline dysplastic, I'm probably just going to do both at the same time and address it all in one setting. But, I will have a discussion of we have research that says you're probably not going to do as well with just the arthroscopy. But some people are like, "Well, that other surgery sounds crazy, so how about we do the arthroscopy first, and then if I fail, I'll do the PAO."

I've had some patients that I went through this process with that they were center edge angle of 21, and anterior center edge was 20, and they had a 65 alpha angle, and anteversion was normal, and they had a stiff hip, and I treated them as impingement. I did a really good job with four [inaudible 00:19:56] stitches in their capsule, thought I did what I could best arthroscopically, and they did good for six months and they were happy. Then they petered off in that six to 12 month range and they came back at a year with the same IHOT they had before surgery. Some of those I've done PAOs in, and they're doing great.

I think that experience has also made me more suggest in these patients that I feel like have an instability component to their pain with borderline dysplasia that we should just do the PAO. I think it's the most powerful surgery that we have in hip preservation. If you look at John Clohisey's recent JBJS paper on borderline dysplastics, I think he had 180 or something outcome scores. I think it was at two years in the '80s and '90s, which if you do a lot of arthroscopy in the borderline population, I don't feel like we got them that good.

Dr. Andrea Spiker:

That's excellent. To finish our conversation today, what are some of the questions that you think we still need to answer to better understand the hips that we've been discussing and maybe in particular, the female hips that we evaluate?

Dr. James Wylie:

Yeah, I mean based on these couple of papers we wrote, I would be a big proponent for all of our hip outcome papers being sex specific. I think we're going to hopefully be publishing on a male cohort coming up of just males, and maybe find some differences. I think when you mix both genders together, you kind of wash out some of the signal from one gender or the other.

I think some important stuff to still question with females is we didn't have Beighton criteria. I mean, it's kind of a surrogate meaning that I feel like in my practice, the patients that are anterior wall deficient, or have lateral FEAR indexes, or have a lot of anteversion, they kind of have that higher Beighton criteria preponderance. But that's another one that when in this patient, if you do arthroscopy, what you're really relying on is getting a good capsule or scarring and healing to plication or whatever. I can't emphasize how important the capsule is if you are doing arthroscopy in the borderline, especially females.

I think papers in females on the effect of Beighton and criteria, and kind of tying all of these things together, which is obviously really hard when you have smaller cohorts, but maybe as we're now putting together this national registry potentially, and some of these NASH, and some of these other bigger

cohorts maybe with higher numbers can look at which of these variables are the actual drivers. Because anteversion, or wall index, or whatever might be drown out by people with over six or seven on the Beighton scale. It's just truly that the soft tissues can't handle an arthrotomy in the part of the hip that can become unstable.

Dr. Andrea Spiker:

All very incredibly important points, so thank you so much, and thank you for spending the time with us today for going over this paper and then sharing your expertise. I really appreciate it, Jim.

Dr. James Wylie:

All right. Thanks for having me, Andrea.

Dr. Andrea Spiker:

Dr. Wylie's article titled Combined Borderline Acetabular Dysplasia and Increased Femoral Anteversion is Associated With Worse Outcomes in Female Patients Undergoing Hip Arthroscopy for Femoroacetabular Impingement can be found online at www.arthroscopyjournal.org. This concludes our episode of the Arthroscopy Journal podcast. Thanks for joining us. The views expressed in this podcast do not necessarily represent the views of the Arthroscopy Association or the Arthroscopy Journal.

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