

KEELAN R. ENSEKI: Thanks for joining me. Again, no disclosures, really just the images. Some are purchased, and some are shared rights with other physical therapy continuing education courses in the public domain.

So today, in the brief time that we have together, I want to basically go over some of the basic evaluation of lower abdominal lower abdominal and adductor injuries, and then the combined presentation in athletic pubalgia. And I'll try and keep it fairly straightforward. It will come from a bit of a rehabber perspective. Almost on the assumption that-- I obviously don't talk much about imaging because it's not something I readily have available, though I appreciated when it is and I have interpretation of it.

I will briefly review what has already been touched upon in much more detail, the interactive function of the core-hip complex. Look at the challenges of evaluating patients in the clinic with the groin pain syndrome presentation. And then three facets-- look at the screening examination, which is sometimes the most important part of looking at these patients examination principles, for specifically adductor regions lower abdominal complex injuries. And then, also the criteria for kind of that combined presentation, which I think is the focus really of today's set of talks. Movement examination considerations or lack of what we have as far as evidence goes for that. And then a quick note on capturing patient reported function.

Again, I think this is not much of a surprise to anybody, kind of the basis of what we're looking at here today, that interactive function of the core hip muscle complex. It is really complex in the way that we look at the function both in from a sports performance perspective, and then in the end, the pathophysiology perspective. And it makes it kind of a moving target when we're looking at evaluating these individuals. I may be dating myself with a clip from the movie *Slap Shot*. OK, sorry about that.

So when we look at the challenges of clinical evaluation for groin pain, it really is mentioned numerous times as syndrome. The problem with that is, there are pluses and minuses to calling it a syndrome, but with this nomenclature-- and then even when we kind of agree upon it with experts, it's still not universally applied and probably never will be for this area-- there are a number of differential diagnosis that we have to consider both as truly differential in how we might treat them, or just coincide. That includes hip joint involvement, inactive populations, there is FAI, and microinstability, stress fractures, osteitis pubis, musculotendinous involvement is really going to be our focus today. The hip flexors, adductor, lower abdominal, what we're focusing on today, the athletic pubalgia, sports hernia presentation, inguinal hernia, pelvic floor, and then nerve entrapment. And really knowing this, and this isn't even all inclusive, this really just drives home that concept that we really have to have a structured approach to effectively screen and then apply region specific principles and evaluation.

When asked for reference, I'll often use the Doha reference. I think the consensus paper, which is freely available that came out of this conference, is very useful. It takes this very substantially difficult concept and at least kind of puts it in some categorization. Which I think has been clinically useful. So the results of this conference is the author's note-- and this is a group of individuals, physicians, surgical and non-surgical, physical therapists and other individuals who researched heavily in this field-- was that there are basically three subheadings of groin pain in athletes. Those defined clinical entities that are particular extra-articular that we'll go over today, hip related groin pain, and then some other causes of groin pain in athletes. And today, looking at that entity that is more extra-articular, we'll particularly focus on the adductor and the pubic related groin component and the combination of those components as well.

So again, in the brief time that we have together today, we'll look at adductor component evaluation, abdominal component evaluation from a screening perspective, associated or coinciding conditions. And then, really how this all presents as this concept of athletic pubalgia, or sports hernia, or whatever you want to call it, core-related groin pain as well. And as mentioned, sometimes the most important aspect of your evaluation is that screening examination. You either want to officially rule out competing diagnosis or know that they're there as associated conditions and account for them. From my perspective, from a therapist perspective or rehab, we look at this kind of drive or treatment approach and what we may have to utilize in intervention.

When you're using the screening examination, I think most of us know this, we want test with high sensitivity. We want to officially be able to rule in or rule out specific other conditions. It's a regional approach, usually often, starting with the hip. Looking for conditions such as FAI, which we already know there's higher incidences of FAI with these individuals who have this presentation. Other conditions can include microinstability and even in osteoarthritis as well.

Quickly rule in or rule out the lumbosacral spinal, nerve entrapment, which will be very challenging we'll just touch upon that briefly today, and the pelvic floor we cannot forget as well, both in males and females. So we'll see a number of tests that are shown on your right, prone knee bend test, look for L2 through L4, lumbar irritability of the nerve roots, the FADIR test, which I think everyone knows for interarticular involvements, but it's much more sensitive and specific when we look at a bend-mend.

Just note it here. I wasn't going to go into detail but Ben had mention and Dr. [INAUDIBLE] as well, we have to consider the nerves in this region stemming from the lumbosacral eye. In particular, too, of particular interest, are the obturator nerve, which you often mimic abductor type symptoms. And if you look at your lower left, those movements that tend to cause symptoms when this nerve is involved, it mimics those movements that the structures that we're discussing today, the muscle tentative structures, also become involved and become symptomatic. The ilioinguinal nerve as well with this twisting and arching maneuver which is considered a clinical test for involvement or for [INAUDIBLE] nerve is also can mimic similar symptoms. So even if it's easier said than done but we have to consider potential entrapment with some of these nerve structures.

So just want to briefly mention screening but then move more into specific evaluation of the adductor region. And you kind of look at them separately the adductor region and then the lower abdomen region. They really bring them to bed together clinically and what presents the athletic pubalgia. Look at adductor injuries, it's pretty well documented in terms of the issues that arise from these, the toll it takes particularly in the athletic world. I know we have a number of professional individuals working professional sports on this conference today.

We look at the mechanism presentation. It's a common cause of groin pain. Structure that after [INAUDIBLE] most commonly affected but remember it is complex for numerous muscles that are involved in this group. There's been a more recent focus on this within the scope of the core abdominal component with in combination for athletic pubalgia. Regardless of this and all the attention and the toll it extracts on us and from athletic perspective and in time lost, the overall quality of studies examining management of groin pain remains pretty low overall. So take that in context with some of the evidence presented. It isn't always the highest.

I can be traumatic or repetitive overload typically stemming from some eccentric component. Kloskowska and colleagues noted about 12 to 18% of yearly injuries for soccer, hockey, American football, Australian football combined stem from adductor type injuries. Within hockey, Tyler and colleagues noted 3.2 per 1,000 player game exposures. 90% were non contact. Emery, this was a very large study back in the late 90s. Emery conducted with NHL players. A conservative estimate of impact in groin and abdominal injuries on each NHL team in that time was about 25 player games per year. And that looked like it was probably going to be more this year before the season was abruptly ended.

When we look at adductor injuries and risk factors, because I think this is important part of the evaluation of identifying these risk factors, we know the number one risk factor with level one evidence is a previous groin injury two times the risk. Probably not a surprise to know that. I think most of us know that since we work with these individuals.

Another one is decreased off season sports specific conditioning in hockey at least. With over 18 skate sessions before this season, there was a decrease incidence by three times, at least this is found by Emery and colleagues. Hip muscle weakness both general and then in the structures of interest. And we do have a level two evidence to show that adductor strength less than 80% when compared to the ipsilateral abductors is it increases the risk of re-injuring the initial injury as well, along with lower abdominal weakness.

There is a bitter debate around decrease hip range of motion but it's probably no surprise given the suggestion that FAI can't be part of this process as well. The problem is not whether sometimes range of motion may have an effect on this presentation. It's very difficult to assess range of motion in a reliable way. Evidence for flexibility is weak. And that's not to say you shouldn't look at flexibility or utilize it in your treatment or interventions, but the evidence actually showing it is related to the mechanism injuries is fairly weak. Maybe more performance is a factor.

So again, the clinical examination for adductor injuries is very impairment based. [INAUDIBLE] our typical physical examination for range of motion, strength, flexibility of tolerated, of course acuity dictates that, palpation. And then we'll discuss the squeeze test. Few things to note, if you do have in the upper right the groin bar, I think it's called the force frame now available, that's great. I don't have that readily available. Some individuals working in higher athletics or clinics that have a little more money than we have right now probably find this very useful. It is accurate within 6% at least in Australian football players.

I particularly want to go over the squeeze test. Sometimes the question is which version of the squeeze test we utilize. Remember the squeeze this is literally just an isometric contraction. And we're looking for symptom reproduction, the patient's primary complaint. And you can do this at neutral, 45 degrees of hip flexion, or sometimes described as 90 degrees flexion as well.

What we do know is that at 45 degrees of flexion, there's some evidence to show-- It was Delahunt that showed that it was optimal EMG recruitment of the adductor groups across the board, optimal force pressure valve measurement. So basically more force produced within the same individuals. And it also showed the strong evidence for correlation of symptoms and strength. Neutral has been described a lot as the adductor squeeze test. Thorborg did a lot of work with this. And that's often been looked at in the return to sport decision making criteria. So they're both very useful and to be honest it only takes two minutes to do the entire spectrum of squeezed test applications. But do know what you're looking at there and some of the evidence that's associated with each maneuver.

I think if we kind of shift the spectrum we get, then we're going to bring this all back together and we look at the athletic pubalgia component and lower abdomen injuries. We have often a similar kind of mechanism or profile. It's a source of exertional groin pain, exertional being the keyword there. Then we look at athletic pubalgia. We do see men more than women. And then maybe there could be reporting bias there as well. But basically we're looking at this disruption at the insertional point of numerous lower abdominal components. And again, it's often part of this combined spectrum that we'll discuss.

Just some notes on particularly the abdominal component. Oliveira and colleagues noted that in 43 individuals with confirmed through imaging and clinical examination for athletic pubalgia. 42 were men. Mean age of 33 years. As per sports, 58% were athletes, were soccer. But again it was in Brazil. If we did this in Canada it would probably look different. 30% runners. 37% were professional athletes.

I think probably the most important out of this study you know that inguinal hernia and their group was diagnosed in almost 21% of patients. So again coming back to your differentials or at least coinciding diagnoses that are occurring with these individuals is very important. Emory in that same study in NHL players in the late 90s found that the mean time loss or the mean time loss from an abdominal injury was significantly greater than that of a groin injury that being an adductor injury when isolated alone. They gave a conservative estimate of 25 player games per year of loss for groin and abdominal injuries.

The lower abdomen region examination can be complicated because of all the overlying structures. But we're really looking again at the strength symptom provocation technique. I'll use a leg lowering technique realizing the hip flexors and other structures are involved in the literature. We'll see discussed the resistivity curl up over the hips flexed and extended.

Keep in mind the legs are straight and the hips are extended does bring in the lower rectus abdominis a little bit more. And that's a good thing. It helps to tease out when we do this in two different manners. Endurance tests have been described, plank variations. I think Rick drives Larry goes over a little bit more of that when he's looking at rehab sports specific turns sports.

And the palpation, I like the analogy that Ben uses and it's been documented or reported that pubic clock. I think it's a very effective way of using a visual or at least a palpable reference. Sometimes in your lower right hand corner, you can see I'll compare that to Van Gogh's melting clocks. As clean and simple it looks in these pictures, when you get into the real patient who structurally can bury in their size. There's apprehension, palpatory skills and reliability there is already low. And the structural variation, that clock sometimes is a little more challenging than what looks like in text and in pictures.

Abdominal strength assessment I think is very straightforward here. This leg lowering task where we allow the individual to actively bring the legs down, controlling it eccentrically looking for their pelvis to maintain a neutral position so they don't go into anterior pelvic tilt. We have the crunch up or sit up tests. This is with the knees flexed also the knees extended. We often would apply external resistance here. The importance of these tests is the lower abdominal's control that excessive anterior pelvic tilting function. We do know that anterior pelvic tilt has been associated with this athletic pubalgia presentation. So we do want to identify not only systematically from a strength of motor control perspective but how well these individuals do with these specific tests.

And then kind of pulling this all together, at least for the time that we have. The athletic pubalgia with this combined presentation, we have both a lower abdomen and an adductor component. This picture should look familiar. I think it has been already shown twice. We have this going back and forth if you are these exertional forces repetitively applied in an insignificant amount across these structures that have common elements as Ben had shown. It is exertional. That's the reason we call it athletic pubalgia.

There are other pubalgias that are out there. It's typically unilateral but can become bilateral. And for the anatomical reasons already discussed, we can see quadrilateral findings as well, which makes it challenging. Again reported more men than women. And we have these shared characteristics of proximal adductor and distal lower abdominal injuries because it really is both. And we basically have the resulting disruptive force coupled.

Often we think, via considerable force created by the abductors, it may be a relatively weak or vulnerable distal rectus rather lower abdominal elements and then a failure of the common structures over time. So we can see here the clinical presentation where you may see discomfort. This is from a nerve muscle from many years ago. But an activity such as this where we have this rapid abduction having to be controlled by the abductors and in a twisting an extension through the upper quarter. These repetitive maneuvers, which you see in soccer and hockey and football as well, along with other sports, really can over time lead to this presentation.

So looking at the clinical examination for this region-- Again we're combining these concepts that we already just briefly discussed. So resistant hip abduction, resisted abdominal testing, I look at those as two qualifiers in your clinical examination. For one than the other, if they're both positive and notably positive, I start to really tilt the diagnosis, the clinical PT diagnosis, when I'm doing it towards athletic pubalgia. Also looking at posture, we mentioned the presence of the excessive anterior pelvic tilt. That to me is important in our setting, the rehab setting. That's something we can often affect. And if we don't, all the other things that we're taking care of this may be a problem. And it's something we can kind of a low hanging fruit. If we could do something about this, whether it's strength or motor control or lower abdominal endurance, we should pursue that.

Palpation, I mentioned the pubic clock which is not as easily applied as it is in the text but is useful. And be aware of contralaterally symptoms because of the shared elements as well. And then, again we already mentioned through your screening examination considering the hip and the lumbosacral spine as well. So this is the same diagram I showed earlier, just combining those concepts from examining the adductor component, the abdominal component, and other related conditions into this combined presentation of athletic pubalgia.

And then there is some published criteria I just mentioned here. Kachinger mentioned five signs that are indicative of athletic pubalgia. Both, and I won't go with it word by word, but looking at course that deep groin lower abdominal pain, exertional discomfort, palpable tenderness in those areas mentioned around the pubic clock, and then pain with both a resisted adductor test and a resisted abdominal curl up. So a lot of why we know is based on these criteria as you can see.

The British Hernia. I should say hernia society criteria for sports hernia is very similar, three out of five of their signs that they list there. But they're very similar as well. So at least there's some agreement there for being considered to have athletic pubalgia.

Just to finish up on a few notes, movement test is very popular obviously in the rehab and sports performance realm. And there's a lot of literature out there on it, both strengths and weaknesses. And in the hip population, it's been particularly lately and I know Ben and Rob Martin who is also on this call have been involved in this work. And we do have a growing body of evidence looking at this in the non-arthritis, hip joint population pick the FAI and to a lesser degree dysplasia and micro instability.

But I think we should note that, while these tests are useful, and I think this performance-- I think they're useful in rehab dictating how we look compared to what we should look like in tailoring our rehab, there is very minimal evidence in these particular extra-articular conditions at least as it relates to your correlation of symptoms or other measurable impairments, PROs, or return-to-sport. Not to say we shouldn't use them but we should recognize limitations where they stand in the literature right now.

Finally I felt obligated to add something in here about patient report outcomes. There are numerous ones out there. I think if you're with a CRS or UPMC. We use the HOS outcomes for. And there are others as well. But to note for this particular group, the validation for this particular group really lies in The HAGIS and a part of this research comes out of northern Europe. But the Copenhagen Hip and Groin Outcome Score has the greatest preponderance of evidence really lies within this patient report outcome by Thorborg.

And I won't go in much detail here. But it's had six subscales looking at pain symptoms, physical function data, living, return-to-sport, recreation, participation in activities, and groin related quality of life. So if you have the choice and a lot [INAUDIBLE] dictates this, HAGOS has the most evidence for application in this population. First time I got done on time. But I have a soon to be six year old who just finished kindergarten. And I don't worry about her with athletic pubalgia, and other conditions and such. I really worry more about probably micro instability or lumbar issues. Thank you for having me. And I look forward to watching the rest of the presenters as well. Have a good day.